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ABSTRACT

The theme of the 1972 annual forum of the Association for Institutional Research, Reformation and Reallocation in Higher Education, was chosen because it was timely and relevant to significant problems of higher education and, therefore, to institutional research. Papers presented at the forum fall under the categories of costs and the financial crisis; curriculum and program evaluation; models, modeling and systems; reaching consensus and establishing priorities; and faculty workload and manpower studies. Invited papers at the conference concerned institutional research as a vital force in higher education, centralization of power in higher education, and open access to higher education as a clue to reformation and reallocation. (HS)

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REFORMATION AND REALLOCATION IN HIGHER EDUCATION

12th Annual Forum of the Association for Institutional Research 1972

Edited by Clifford T. Stewart

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REFORMATION AND REALLOCATION IN HIGHER EDUCATION

TABLE OF CONTENTS

FOREWORD ix

CONTRIBUTORS – 1972 PROCEEDINGS x

PRESIDENTIAL ADDRESS AND INVITED PAPERS

Institutional Research: Vital Force in Higher Education
Richard R. Perry 1

Centralization – Friend or Foe
Robert B. Mautz 6

Open Access – A Clue to Reformation and Reallocation
Harold L. Hodgkinson 10

CONTRIBUTED PAPERS

COSTS AND FINANCIAL CRISIS

Costing Graduate Education Programs: Some Empirically Based Considerations
John W. Alden 17

Resource Optimization in a Private Institution – A Case Study in Institutional Planning
Paul F. Maeder, Everard Nicholson and Eric Brown 24

Implementing a Distributive Cost Matrix at the University of Denver
Ralph A. Forsythe, Elmo V. Roesler and Jerome F. Wartgow 30

Sponsored Programs' Contribution to the Financial Crisis in Higher Education
Norman E. Taylor 35

How to Cost a University Program
John W. Ridge 38

A Graduated Tuition Program
Edwin F. Wilde 42

CURRICULUM-PROGRAM EVALUATION

Meeting the Challenge of Open Admissions and Maintenance of Academic Standards – Program Experimentation with Limited Institutional Resources
W. Sam Adams 46

Improving Administrative Decisions on Teacher Effectiveness
LeRoy Olson 51

The Evaluation of Educational Changes in Higher Education
Robert R. Wright 56

Faculty Characteristics as Related to Teaching Workload: A Heuristic Model
James E. Prather and Glynton Smith 60

Reconceiving and Reallocating Resources in the Community College:
A Researcher's Perspective
Fred A. Snyder 133

Sharing of Facilities Among Institutions
John T. Richardson 137

Reassignment of Facilities Within an Institution
William E. Stallman 139

Institutional Research in the New Higher Education Environment:
Summary of Panel Discussion
Robert J. Parden, Elwin F. Cammack and John J. Coffelt 142

Eight Years of Program Budgeting at the Ohio State University and
In Higher Education in Ohio
George W. Baughman 143

Institutional Experience with PPBS: The Case of Florida State University
Augustus B. Turnbull 147

University Costing – The Ontario Experience
Bertrand L. Hansen 152

The Reformation of Goals at North Carolina Central University: A Case Study
Edward A. Nelsen 155

What Can the Teachers' Union along with Institutional Research do to Improve
Higher Education?
Israel Kugler 159

Building New Programs on the Ashes of the Old
F. Craig Johnson 161

The Allocation and Reallocation of Financial Resources to Universities
Jerry Rust 164

Allocation of Resources within an Institution of Higher Learning
Pascal Reeves 167

The Allocation and Reallocation of Financial Resources to Departments of
the University
Wallace Prescott 169

WORKSHOPS

WORKSHOP FOR THE EXPERIENCED

Toward Reliable Revenue Forecasting
John N. Burnham and Earl D. Thorp 171

NATIONAL CENTER FOR HIGHER EDUCATION MANAGEMENT
PROJECTS: CRITIQUE AND RESPONSE

Joint Workshop of AIR and NCHEMS
William L. Tetlow 172

An Alternative to the NCHEMS Program Classification Structure
A. A. Sterns 172

Critique of the NCHEMS Student Flow Model (SFM) Project
Allen Barwick 173

Critique of NCHEMS Faculty Activities Analysis (FAA) Project
Donald C. Lelong 174

Critique of NCHEMS Information Exchange Procedures (IEP) Project
DeForest L. Trautman 174

Critique of NCHEMS Resource Requirements Prediction Model (RRPM) Project
Bernard S. Sheehan 175

Critique of NCHEMS Cost Finding Principles and Procedures (CFP) Project
David R. Witmer and James R. Topping 176

SPECIAL INTEREST GROUPS

CANADIAN INSTITUTIONAL RESEARCH

The Report of the Commission on Post-Secondary Education in Ontario
Douglas Wright 178

Comments on the Draft Report of the Commission on Post-Secondary
Education in Ontario
Bertrand L. Hansen 181

Institutional Research Implications of Ontario's Wright Commission on
Post-Secondary Education
Bernard S. Sheehan 182

ACADEMIC PLANNERS

Toward Academic Development and Curricular Renewal in the Context
of Institutional Stability
Tom Maher and Donald A. Ostasiewski 185

FOREWORD

The theme of the 1972 Forum "Reformation and Reallocation in Higher Education" was chosen because it was timely and relevant to significant problems of higher education and, therefore, to institutional research. The theme is general enough to evoke interest from a broad spectrum of institutional research officers and permits an emphasis on both cost and effectiveness considerations.

Through general sessions, seminars, workshops, special interest groups, contributed papers, invited addresses and special discussion sessions, we hoped to cover all aspects of reformation and reallocation and to provide both the format and content to suit the individual needs of the participants.

This year, for the first time, an Editorial Board evaluated the many papers submitted for publication in the Proceedings. In previous years, this job fell to the editor alone. Therefore, I would like to express special thanks to the Editorial Board for their excellent work on the papers contained in the 1972 Proceedings.

December, 1972 **Clifford T. Stewart**

CONTRIBUTORS – 1972 FORUM

ADAMS, W. Sam
Staff Research Associate
Wisconsin State University
Test and Research Services
Oshkosh, Wisconsin 54901

ALDEN, John W.
Director Office of Institutional Studies
The University of Vermont
Burlington, Vermont 05401

BAKER, George
Program Associate
National Laboratory for Higher Education
W. Chapel Hill Street
Durham, North Carolina 27701

BARWICK, Allen
Director of Institutional Research
North Carolina State Board of Education
Box 10887
Raleigh, North Carolina 27605

BAUGHMAN, George W.
Executive Director of the University Budget
The Ohio State University
2130 Neil Avenue
Columbus, Ohio 43210

BOGUE, E. G.
Director Institutional Research
Memphis State University
Memphis, Tennessee 38100

BROWN, Eric
Assistant to the Provost
Brown University
Providence, Rhode Island 02912

BROWNELL, Richard
National Laboratory for Higher Education
W. Chapel Hill Street
Durham, North Carolina 27701

BURNHAM, John M.
Assistant Professor
Department of Management Sciences
University of Miami
Coral Gables, Florida 33124

CAMMACK, Elwin F.
Assistant Vice President
University of Wisconsin
1728 Van Hise Hall
Madison, Wisconsin 54706

CHAMBERLIN, Gary D.
Assistant Director
Department of Higher Education
401 National Old Line Building
Little Rock, Arkansas 72201

COFFELT, John J.
Vice President for Administrative Affairs
Youngstown State University
410 Wick Avenue
Youngstown, Ohio 44503

COLEMAN, Daniel R.
Assistant Director of Research
Florida State University
1650 Airport Drive
Tallahassee, Florida 32304

FORSYTHE, Ralph A.
Director of Institutional Research
University of Denver
Denver, Colorado 80210

GRUBB, Richard E.
The Pennsylvania State University
Vice President Administrative Services
203 "C" Old Main
University Park, Pennsylvania 16801

HANSEN, Bertrand L.
Director of Research
Council of Ontario Universities
102 Bloor Street, W.
Toronto, Ontario, Canada

HODGKINSON, Harold L.
Project Director
Center of Research and Development
in Higher Education
University of California, Berkeley
Berkeley, California 94720

JOHNSON, F. Craig
Director, University Self-Study
Florida State University
9 Kellum Hall
Tallahassee, Florida 32306

JUDD, Robert C.
Professor and Chairman
Department of Operations Analysis
University of Toledo
Toledo, Ohio 43606

KEENE, T. Wayne
Acting Director
Office of Academic Planning and Analysis
University of South Florida
Tampa, Florida 33620

KELLAMS, Samuel E.
Assistant Professor of Education
Center for Higher Education
University of Virginia
Charlottesville, Virginia 22903

KOHLER, Emmett T.
Director of Institutional Research
Mississippi State University
Drawer FY
State College, Mississippi 39762

KUGLER, Israel
President
United Federation of College Teachers
New York, New York

LARKIN, Paul G.
Director of Institutional Research
Prince George Community College
Largo, Maryland 20870

LAUGHLIN, J. Stanley
Coordinator
Institutional Studies
Kansas State Teachers College
Emporia, Kansas 66801

LELONG, Donald C.
Director of Institutional Research
University of Michigan
6060 Administration Building
Ann Arbor, Michigan 48104

LESLIE, David W.
Assistant Professor of Education
Center for Higher Education
University of Virginia
112 Peabody Hall
Charlottesville, Virginia 22503

LUCAS, John A.
Director of Development and Planning
William Rainey Harper College
Algonquin and Roselle Roads
Palatine, Illinois 60067

MAEDER, Paul F.
Associate Provost and Vice President
of Finance and Operations
Brown University
P.O. Box 1940
Providence, Rhode Island 02912

MAHER, Tom
Director
Program Analysis and Evaluation
University of Kentucky
Lexington, Kentucky 40506

MAUTZ, Robert B.
Chancellor
State University System of Florida
107 W. Baines St.
Tallahassee, Florida 32304

McDOUGALL, R. N.
Research Associate
Council of Ontario Universities
Toronto, Ontario, Canada

NELSEN, Edward A.
Director of Research
North Carolina Central University
Education Building
Durham, North Carolina 27707

NICHOLSON, Everard
Research Analyst
Brown University
Box 1913
Providence, Rhode Island 02912

OLSON, Le Roy
Professor
Office of Evaluative Services
Michigan State University
East Lansing, Michigan 48823

OSTASIEWSKI, Donald A.
Chairman
Division of Economics and Business
Thomas Moore College
Ft. Mitchell, Kentucky 41017

PADILLA, Arthur H.
State Board of Higher Education
1307 Glenwood Avenue, Room 162
P. O. Box 10887
Raleigh, North Carolina 27605

PANGALLO, Clement D.
Mississippi State University
State College, Mississippi 39762

PARDEN, Robert J.
Dean
School of Engineering
University of Santa Clara
Santa Clara, California 95053

PERRY, Richard R.
Associate Executive Vice President
University of Toledo
2801 West Bancroft
Toledo, Ohio 43606

PRATHER, James E.
Office of Institutional Planning
Georgia State University
Atlanta, Georgia 30303

PRESCOTT, Wallace
Academic Vice President
Tennessee Technological University
Cookeville, Tennessee 38501

REEVES, Pascal
Assistant to the Provost
University of Georgia
Athens, Georgia 30601

RICHARDSON, John T.
Executive Vice President
De Paul University
25 East Jackson Boulevard
Chicago, Illinois 60604

RIDGE, John W.
Director of Institutional Studies
Wisconsin State University
Office of Institutional Studies
Eau Claire, Wisconsin 54701

ROESLER, Elmo V.
Special Assistant in Institutional Research
Appalachian State University
Lyons Apts., No. 11
Boone, North Carolina 28607

RUST, Jerry
Associate Director of Fiscal Affairs
Tennessee Higher Education Commission
908 Andrew Jackson Office Building
Nashville, Tennessee 37219

SHEEHAN, Bernard S.
Director Institutional Research
Education Tower
University of Calgary
Calgary, Alberta, Canada 70

SMITH, Glynton
Administrative Specialist
Office of Institutional Planning
Georgia State University
33 Gilmer Street, S.E.
Atlanta, Georgia 30303

SNYDER, Fred A.
Director Research and Planning
Virginia Department of Community Colleges
911 E. Bird Street, Box 1558
Richmond, Virginia 23212

STALLMAN, William F.
Director
Office of Space Utilization
University of Illinois
Urbana, Illinois 61801

STERNS, A. A.
Director Program Planning Analysis
University of Georgia
White Avenue Building
Athens, Georgia 30601

TAYLOR, Norman E.
Vice President, Research
University of Montana
Missoula, Montana 59801

TETLOW, William L.
Associate Director
Office of Academic Planning
University of British Columbia
Vancouver 8, Canada

THORP, Earl D.
Department of Politics and Public Affairs
School of Business Administration
University of Miami
Coral Gables, Florida 33134

TOPPING, James R.
CFP Project Manager
NCHEMS-WICHE
P. O. Drawer P
Boulder, Colorado 80302

TRAUTMAN, DeForest
Director
Long Range Planning
SUNY-Stony Brook
Stony Brook, New York 11790

TURNBULL, Augustus B.
Assistant Vice President for Academic Affairs
Florida State University
Tallahassee, Florida 32304

UHL, Norman P.
North Carolina Central University
Research and Evaluation
Durham, North Carolina 27707

WARTGOW, Jerome F.
Coordinator of Research and Evaluation
Governors State University

WILDE, Edwin F.
Vice President for Planning
Beloit College
Beloit, Wisconsin 53511

WITMER, David R.
Director Institutional Studies
Board of Regents
Wisconsin State University
142 E. Gilman
Madison, Wisconsin 53702

WRIGHT, Douglas
Deputy Minister of Social Development
Ontario Government
N 408, Parliament Building
Queen's Place
Toronto, Canada

WRIGHT, Robert R.
Director Institutional Research
State University of New York, Albany
130 Westchester Drive
Delmar, New York 12054

INSTITUTIONAL RESEARCH: VITAL FORCE IN HIGHER EDUCATION

Richard R. Perry
The University of Toledo

The concept of a third force in the disciplines of higher education, or to widen the idea by speaking of a third force in any rational process, is certainly not new. It may seem that to construe institutional research as a third and vital force in higher education is a challenge eagerly accepted, but one which requires considerable patience for its development. Allow me to develop a basis for the third force concept and then by analogy to illuminate why this role may fall so rightfully on the shoulders of institutional research.

ASPECTS OF LOGIC

As the well known functions of institutional research are considered, we need to understand how greatly institutional research is concerned with the creation of logically based operations.

There are three aspects to every logical thought. There is the ***abstract*** or ***rational form*** of thought which says *what something is.* In saying what something is, the great burden placed on the determiner of what is will be the requirement to be absolutely accurate in perception and description of what is alleged to be. This requirement, this burden, this challenge, mandates exceptional and rigorous criteria to be followed in that process. If one is to be absolutely accurate in perception and description of what is, then one must be that kind of person not easily swayed by every summer breeze or wintry blast which seeks to move him from his position, cloud his perception, and in short convince him that some fantasy, or that which *appears to be,* is really that which is. At this stage in the construction of a thought, an idea, or concept which can be defended as logically true and thus real, we are on the path of taking the first steps toward the discovery of reality. The foundation of that step is accuracy. Some weary of this task at the first step, citing that the task is too arduous, arguing that it is unneccessary, or suggesting that the task can be left to others, or that what is, should be described in generality and approximation. For the concerned researcher there is perhaps no more important step than this first one which requires him to be accurate in his descriptions of what is.

There are those who say that the steps necessary to discover the real world are senseless for we know that reality is relative and that our difficulties arise chiefly when we begin to force understanding along the line that there is only one realtiy, only one way to think, only one way to solve a problem. This rationale works best in privacy. It seldom bears up under the scrutiny of differing views.

A second aspect of every thought, every idea, every concept, is its dialectical negation, or that which is its opposite, that which says that what is alleged to be is not. This negative is the rebuttal statement to the one offered as being true. It is the negative side of every argument. It is the opposition to every idea. It is the counter force to every proposition. It is that statement which says that what is proposed to be done cannot be done or that it should be done so differently as to destroy the original proposition's integrity.

The third characteristic in every logical thought is the speculative aspect which represents complete comprehension resulting from full understanding of all aspects of the thought. At this point the concept becomes whole, becomes energized, becomes in another sense operational. At least it has realistic possibilities of operational fulfillment, for it has been brought to full systematic comprehension. [1]

The process which has been described in terms of the characteristics of logical thought is known in a different discipline as the dialectic. The first aspect of thought, which was described as a statement of what is, can take the form of a thesis statement. The dialectical negation described as the second characteristic of thought takes the form of antithesis, and the third characteristic, that of speculative comprehension, takes the form of synthesis. In this philosophic base, shortened in its description here, one catches a glimpse of where such paths of argument can lead in considerations of institutional research. Spelling out this first position suggests that institutional research in its present functioning may lack a philosophic-logical orientation.

The concept of a third force and the development of a third force in other areas of endeavor have proven fruitful. Third force concepts in international politics are readily brought to mind in the developments proposed by Charles de Gaulle after World War II and particularly after the decade of the 1950's. The impasse and increasing tension built in Europe between the conflicting claims of the United States and Russia left European states with a sense of not being able to control their own destinies. De Gaulle, during the early 1960's, conceived and developed the concept that a French led Europe could become the necessary third force in world politics. De Gaulle conceived the useful function of providing the then two chief great powers of the world with an additional force with which to reckon as they sought to control the world. The third force in de Gaulle's terms sought to serve as a balance weight in the decision making processes of world politics. To the extent that Europe failed to become a great nuclear power the concept failed, but in the sense that in its time it served to give the great powers of the world pause to reconsider their actions, it was a success. In short the third force concept in world politics as developed in Europe in the early 1960's served the third function in the construction of logical concepts, for it indeed provided the speculative comprehensive understanding necessary for a synthesis of the thesis and antithesis roles played by the United States and Russia at the time.

The concept is one which was found on another front in world politics during recent times. The struggle for the control of China and the ultimate fall of the Kuomintang government to the Chinese Communists is familiar to all of us. There is no need to recite that history to refresh our minds. It is useful to recall that there were reported to be many in China who were neither enthralled with the conservative type of totalitarianism of the Kuomintang government nor the radical type of totalitarianism imposed by the Communist government. The third force which apparently still thrives on the Chinese mainland was one which looked to a logical or rational solution of the difficulties of that society and which since its beginning in 1937 has called itself the Third Force in China. The usefulness in calling it to our attention here is that inherent in its work was a philosophic orientation that, as a result of understanding the central points of opposing sides, positions with sharply different views, it was able to effect a third more stable, more acceptable, more productive line of action. The third force operating in China sought to accomplish a stage beyond the speculative comprehension and understanding which pervaded de Gaullist third force politics in Europe. In the operation of the third force concept in Chinese politics it sought to point the way to what ought to be.[2]

THIRD FORCE IN LITERATURE

The world of literature and the fine arts is not without attempts at the creation of third force concepts useful to that discipline. Those familiar with literary history are aware that until the first quarter of the 20th century any literary history of the United States possessed strong characteristics of lingering European colonialism.

> Literary history conceives of literature as one aspect of organic evolution, limited by time and space for the purpose of study, and determined by forces and factors both within and without the individual and collective experience of the writers who lived in that time and place. Its primary concern is with the relations rather than with absolute values, but it is dependent on criticism for appraisal of these values, and on other forms of history for the analysis of its causes. The result is that the literary historian is often a critic or a social or economic historian as well, and it is right that he should be. [3]

The literary historian as known by students of literature is indeed a linguist. He is a textual critic while at the same time being a literary critic. His role as a literary historian has a precise function. The literary historian must answer such questions as How?, When?,Where? and Why? in relation to works of literature. More importantly, his critique of a work in literature requires that he relate it to other works and, if he is very good, to the whole history of man as a social being. Compare just for this short moment the role of the literary historian with the role of the institutional researcher at this point in higher education.

INSTITUTIONAL RESEARCH FOUND WANTING

Indeed the institutional researcher does to some extent describe how, he does describe when, he can describe where. Seldom does he describe why an event occurs in education. In all his uses of sophisticated models for the projection of enrollments or for cost estimation models has he been able to accurately identify why the factors which so critically affect the configuration of his models create the effects they do? Much less has the institutional researcher been able to relate the results of his research to the whole meaning of man as a social being. It is on these latter two fronts that institutional research has fallen short of accomplishing a firm philosophic orientation to direct its work. If he is to achieve the level of critical ability that the literary historian achieves, then, as the literary historian is an historian of other historians, so the institutional researcher by analogy must become a researcher without peer among researchers of higher education. Faced with problems of educational theory and philosophy, with the challenges of educational management, planning, politics, and with the science of education as well as its finance, he must master them all. The institutional researcher must be in a position to not only analyze all of the varying claims which are put forth to describe what education is, he must also be able to identify that which is not beneficial to education and, in doing so, analyze and synthesize to the point of speculative comprehension all that is representative of research in education, so that he may suggest what education ought to be.

THIRD FORCE PSYCHOLOGY: DIRECTIONS FOR INSTITUTIONAL RESEARCH

One more analogy may be useful to sharpen concern about the philosophic base for institutional research. The psychology of Abraham Maslow has recently been described as third force psychology.[4] Different from the psychology of Freud and the physiological psychology of Pavlov, and far different from the behaviorism of Watson, the third force concept of the psychology enunciated by Abraham Maslow has come to mean the self actualization of man. As man becomes whole he frees himself from inner constraints placed on him by the needs of his ego and those extra-personal constraints placed on him by the vectors of directional behaviorism. I choose this last analogy not so much as one which should serve as a beam for the behavior and future of institutional research personnel, but more as a guiding light for the effects the research performed by institutional researchers might have in shaping the directions of the institutions they serve. One who is knowledgeable at even basic levels in higher education today must of necessity agree that there have been few times in the development of higher education in the United States when higher education has been less in command of the directions which it wished to take than it is at present. When the executive director of a state controlling board of higher education is able to achieve the kind of support from his board which permits directives suggesting that some state institutions completely abolish programs of education serving hundreds and, in some instances, thousands of students in favor of their continuance at a limited number of institutions of higher education in the state, I suggest that higher education is not in control of its own directions. When the newly appointed president of a major university refers to his appointment as an opportunity to get the "shop" in order, the connotations of the word "shop" suggest that higher education is being turned over to the direction of those who are not by empathy, by tradition, by experience, or by desire or design, educators. When the techniques of management for management's sake are applied to education, I suggest that higher education is not in control of its own direction. It may be, as some have said, that education is too important to be left to the direction of the educator, but if higher education is to assert its rightful control over the process, the content, and the personnel of its function, it will need to be able to speak about the consequences of alternative sets of action with such certainty and on such firm ground that those who represent the antithesis of education will understand that proposals put forth by higher education are more meaningful and beneficial than those imposed on higher education from less qualified sources.

It takes only quick contemplation to realize that the initiative for direction in higher education has been taken out of the hands of the educator. The determination of programs of study in terms of content, quantity and, at times, quality is now and for the immediate future in the hands of those who are concerned with the cost effectiveness of those programs. Institutional researchers have been so ***unsuccessful*** in their work at the first level of the construction of our logical concept of education that we have fallen into the trap of deliberately quantifying what is purely a qualitative experience. The choice of the word unsuccessful is deliberate for had institutional researchers been successful in the higher claim that education has on research efforts, it would not have fallen into the trap of quantifying what is essentially a qualitative experience. Institutional researchers have been eminently successful in quantifying the educational function. They have analyzed and quantified faculty workloads. Higher education is thus now at the threshold of piece work compensation scales. Institutional research has been successful in establishing space factors to be utilized in the construction of educational facilities, whether classroom, laboratory or library. Enrollment models have been developed and sophisticated cost and resource estimation models are being constructed.

Each of these in its own right has served on the one hand to promote a thesis of success for institutional research in the quantification of our educational efforts and on the other hand to construct with rather devastating results the antithesis of its failure to do significant, useful, important, and absolutely necessary work in identifying the qualitative aspects of education.

An earlier reference had been made to the contribution of Abraham Maslow in his creation of a third force in the field of psychology. The primary force in psychology for at least a hundred years had been that created by Sigmund Freud. Freud created psychoanalysis as the methodology for alleviating the difficulties of the mentally ill person. The difficulty with Freudian psychology for Maslow was that he found that one was constantly preoccupied with the insane, the neurotic, the psychopath, the criminal, the delinquent, the feeble-minded. Being constantly involved with situations and personalities which represented poor mental health gave the individual who had to work with these sets of circumstances less and less opportunity to be enthused, to have high hopes, to raise his level of aspiration, to create high expectations as to what would be possible. One's level of aspiration consistently decreased. Expectations for education, if one were to use this analogy, would be diminished. We would, as is the case in our regression equations once the predictors had been established, continue to project a downward trend in the influence and the ability of the institutions of higher education to direct their own affairs.

Maslow found similar fault with the behaviorist psychology of Watson. He pointed out clearly that the behaviorist tends to study averages placing great emphasis on statistical methods. The behaviorist emphasizes the study of what ***is*** rather than what could be or what ought to be. Those who work with the statistics generated in the field of education, and particularly as they are associated with the management of education, find that what is calculated to be the norm soon becomes what is expected to be. If we find that the cost for programs should be at any particular average dollar amount, then this is quite likely to be reflected in the next appropriation schedule from controlling bodies. While the difficulty that Maslow found with Freudian psychology was the necessity to constantly be involved in the study of people with poor mental health, and the difficulty he found with the behaviorist was that of constantly grinding the expectation and aspiration level of society down to what is calculated to be normal, so the institutional researcher may find himself in a particular dilemma in which the analogy of Freudian psychology finds him increasingly dealing with an institution or entire system which has been so frequently described to us within the last ten years as being sick. It is as if the institutional researcher in the last ten years has had to watch the breakup and disintegration of a strong, healthy, well respected person.

In terms of the behaviorist approach, institutional research has found itself in the last ten years in the position of becoming so enamored with the statistical quantifying approach to education that it now finds the numerous norms for faculty workloads, space utilization, cost per student credit hour, cost per degree, student and faculty attitudes toward the institution, society, and higher education in general like a Frankenstein which will no longer obey its master. In short, institutional research may be at the point where it is caught with ability to describe only those things which are construed as negative and alien to higher education, or at best to describe higher education in normative terms. These provide little or no opportunity for the striking uniqueness which must be provided in depicting education.

Surely we are not content with a deteriorating personality in an individual and we are no longer content with accepting the norm as the best that we can expect and therefore that to which we should aspire. Maslow provided a third force psychology which he identified as ***eupsychian.*** The term coined by Maslow seeks to describe human oriented institutions. In short, it is descriptive of humans and their institutions at the highest peak of psychological health. It represents the achievement of individuals who have reached self actualization wherein they can with competence, respect, and the maintenance of integrity display uniqueness and know full well that such a display and the consequences of it will not only be appreciated by others but will have a positive and beneficial effect on all.

Institutional research too often forces the study of institutions which are in trouble or departments of institutions which are in trouble. That is like studying the mentally ill. Valuable, but insufficient. In addition, it is forced by present circumstances to study, describe and emulate the average institution. Average salaries, average program achievements and average workloads abound as findings in institutional research, but these do not satisfy. Perhaps institutional research, like eupsychian psychology ought to concentrate on institutions which are outstanding, successful, unique and self-actualized. Perhaps institutional research should in the future constantly study those graduates of institutions which are outstanding, those who make the greatest contributions to mankind. Perhaps it should research those students who are not problems but who are positive contributors to the university, its programs and ultimately society.

Of primary importance to the work of institutional research must be its ability to identify, describe and articulate the creative quality of educational programs. The psychologist will attest to the fact that creativity is synonomous with sound mental health. The creative person is that person who represents humanness at its fullest. Educational institutions which are creative will be human also.

One last analogy from the disciplines will suffice to bring this thesis for institutional research to its closing statement. Mention has been made in the beginning of the dialectic with its synthesis preceded by antithesis and thesis. Institutional research has come through two stages in its development and is moving hopefully into the third. When institutional research began as a structured and formal activity with great energy in the decade of the 50's, one could consider that it was in the stage of romance. The subject matter for institutional research had the vividness of novelty. There were many unexplored connections. There were half disclosed treasures glimpsed, partially seen and enticing. There, just below the surface waiting for the energetic individual, lay the half concealed wealth of material. The knowledge of institutional research at that time could not be said to be dominated by systematic procedures. Normalizing procedures in data definition had to await developments of 15 years to the latter part of the 1960's. This first stage of institutional research work was the stage of romance.[5] It was romance, for romance is essentially the excitement consequent on the transition from awareness of bare facts to the first realization of the importance of facts to incompletely explored relationships.

The second evolutionary stage for institutional research is that which overlaps the stage of romance. This is the stage of *precision*. It is in the stage of precision occurring at about 1965, and coming onto the present, which represents additions and refinement to knowledge resulting from the efforts of institutional research. The concentration of institutional research has been on precision, on systematizing our methodologies and our knowledge. Our difficulties with the stage of precision have been that too often our interest in precision has produced a series of meaningless statements about bare facts. These are often produced artificially without any further relevance than relationships to the facts which support them and often fail to explore the consequences of the application of the findings to the well-being of the activity they are designed to support, the education of human beings. One can connect the stage of romance with the thesis of the dialectic and the stage of precision with that of antithesis. It is in the precision stage that analysis is forced. A first step in that analysis is often the null hypothesis – a negative statement.

Institutional research now needs to move to the third stage which in the dialectic is synthesis and which, in Alfred North Whitehead's philosophy, is the stage of generalization. It is in the third stage that the romanticism of the first and the precision of the second can, through comprehension and understanding which results from a theoretical testing of the consequences of alternative plans of action, mean that a new set of objectives for education can be established. To establish these new sets of objectives requires that a new force be constituted to assist their formulation.

A new force needs to be identified to accomplish the task of making clear new sets of objectives because the one currently available with traditional credentials for establishing these objectives is impotent. That traditional force, the collective academic community, has in the past spoken as if it had been in control of its future, speaking as if the authority with which it set forth its objectives and methods of operation was received with respect and subject to little question by any counter force. This is no longer true in higher education. Higher education has been under increasing attack from the general public. Recently it has come under criticism of legislators who, annoyed with the results of univeristy programs and faced with increasing demands on the fiscal resources of their states, have looked to budgets for higher education as a source of reformation and reallocation.

A new decision base has arisen in higher education to assist this effort at reformation. It is counter to traditional concepts of what education has been. That decision base is the application of systematic management techniques, analyses, and standards to the functions of education. Reference was made earlier to the quantification of the process of education. On philosophic grounds one can identify the thesis of education speaking for its own discipline and defining its own activity and standards. The antithesis is the application of these management directed standards to the educational process. Often unaccustomed to and basically untrained in the language, the methodologies, and the ability to clearly construe the consequences of educational programming under new seemingly non-educationally established sets of standards, the academician refuses to accept what might be benefits accruing from new and different requirements for justifying his programs. The new force of planning and management in large part appears influenced by those who are not by orientation, empathy, or design supportive of the traditional educational process, its objectives, and its results. Education should be a humanizing, qualitative experience designed to realize the greatest human development possible in the individual. That qualitative experience in large part escapes the confines of quantification. It, like elusive quicksilver, cannot be easily grasped to set in new configurations. The force of management and planning with all its potential good is misunderstood, feared and threatening to the greater part of education. Its language seems alien to the nature of education. The educator speaks of "behavioral achievements," management speaks of "through-put." The scholar speaks of following the argument or the research project where it leads. The planner often must say, "Follow it as far as it is funded."

The vital third force role for institutional research is to serve as the interface between the thesis of education and its methodologies of accomplishing its self-declared objectives and the antithesis force of those who come now so directly in control of the future of the educational process and which represent application of quantifying standards to education. Academicians from all fields, not having access to the data base and the continous update training, and not having at hand the standards utilized for interpretation, are ill-equipped and thus fearful, skeptical, increasingly weary of and antagonistic to what they are being told to do in order to justify their academic programs. The antithesis, cast in the role of the centralized planner, whether on the institutional, state, or regional level, is increasingly weary of the academician's inability or seeming unwillingness to justify his activity in terms of and according to standards which for other large scale industries appear to have been found useful. Lines of communications between these two groups appear increasingly tenuous.

Higher education, whether represented by institutional administration or faculty, appears to have developed characteristics of paranoia. One might go so far as to say that the actions of some interested in controlling higher education have taken on the aspects of sadism. The reality of the situation is that the extremes just suggested are not accurate descriptions but are indicative of a need. A knowledgeable force is needed which can offer rational, logically constructed analyses which describe education for what it is, indeed for what it ought to be, and in terms of the kind of freedom, the kind of self-actualization, the kind of self determination which will enable it to be the humane and humanizing force it should be for society. Institutional research has within it competence, the skills of quantified management-oriented standards and procedures, as well as the qualitative criteria expectations of the educational process. This enables it to act as interpreter, as mediator, as a tutor to the opposing forces. It is as if higher education at this moment needs some force to interpret to those who, out of the necessities of their responsibilities, would restrain, overcontrol, and by such restraint and control force reformation of educational programs before the consequences of such reformation can be considered. At the same time a force is needed to interpret the striking uniqueness that each institution should achieve in order to fully realize its character as a locus of human qualitative experience. Decisions about education, its programs, its direction, its funding and its leadership must be based on research. An important part of that research can be done by institutional research. A recent statement has indicated that at present:

> There is little argument among higher education administrators about the necessity of planning and decision making in terms of the outcomes of higher education. Indeed the opinion that higher education must move in that direction appears to be both widely and strongly held but to a large extent it is the planners and decision makers in higher education who must take the lead, not the researchers.[6]

This seems to say that important decisions about what will be taught, when it will be taught, and to whom will be left to planners and decision makers without benefit of research counsel. Major errors that have been made in every endeavor have been because plans and decisions have been effected before adequate research has been accomplished. I suggest that planning and decision making are part of the dialectic, planning representing, if you will, the thesis of what is to be and what is.

The decision process in its operation posits a negative statement, denying for the moment a plan in order to force planning objectives to justify the activity which is proposed for implementation. The decision can be made more intelligently and the planning goals more effectually realized if research results are available. Institutional research is the source of information for planning and decision making. It would have been better if the statement I referred to earlier about planning and decision makers taking the lead, not the researchers, had read that planners and decision makers in higher education must depend upon the contributions of institutional research in order that the path to be followed can be chosen against a background of carefully considered alternatives and consequences.

Institutional research in its work must turn increasingly to identifying those qualitative aspects of education which escape quantification, and which must be included in the planning and decision processes which now rest so completely on quantifiable data.

Thesis and antithesis, romance and precision, planning and decision making are inert, sterile, unfruitful in the absence of energizing, vitalizing third forces. In the Hegelian dialectic, for thesis and antithesis, that realized force is synthesis. In Alfred North Whitehead's philosophy, romance and precision have their generalization. In higher education and its management we have planning and decision. The vitalizing third force for higher education can be institutional research.

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CENTRALIZATION – FRIEND OR FOE

Robert B. Mautz
State University System of Florida

Communication is an extraordinarily fragile thread. You may, for example, have heard of the college president who at the end of a convocation asked the audience to rise while the faculty passed out. And then I am sure you have heard of that classic response to the question asked by the institutional research officer, "How many people do you have in this university broken down by sex?" to which the answer was, "Liquor is more of a problem with us." I had written several speeches for today. I tore up the last one when I arrived, looked over your program and saw the very high calibre of speakers, the kinds of questions you are debating and the expertise and knowledge of those on your panels. I looked over your program and concluded you are addressing the live and fundamental issues in education and are as familiar with them as with the literature that addresses these issues as I am, in fact probably more so. I spent some time rethinking my remarks. In the process I noted that your theme, reformation and reallocation, and my own responsibilities present a very natural alignment. Hence I thought it would be of interest to you to give some insights into the predicament and the opportunities as I see them. The purpose of your organization is "to advance research leading to improved understanding, planning and operation of institutions of higher education." Offices such as mine are growing in number. They have as their principal responsibility the planning and operation of institutions of higher learning. They attempt to bring a rationale to the operation of numerous institutions in order that the various needs of the state in the area of higher education might be met as efficiently as possible.

It is impossible to talk of the principal function of planning except in terms of present trends projected into the future and new and changed trends. It is equally impossible to talk intelligently without having facts and hence implicitly to raise the question as to the role of research. Research must help provide the facts and analysis which enable administrators to render decisions which shape and reshape institutions to dramatically changing times. In the process of discussing some of these changes and needs, I hope to shed some light from my perspective on that eternal question, the role of the central office, whether it be that of the department chairman, dean, president, or chancellor, and touch upon the forces that are moving us toward centralization and decentralization.

There is, as you know, a growing trend for states to centralize administrative responsibilities for higher education in offices such as mine. The last states to join this trend were North Carolina, which created the University of North Carolina embracing all institutions of higher education in the state, Wisconsin, Tennessee and Kentucky. The creation of central state offices is accompanied by an aura of removing certain levels of decision making from institutions to central offices. In its bleakest interpretation, decision making is moving from the campus to the capital. A kinder interpretation might be that decision making in higher education is being moved from the legislative political arena to offices which specialize in the operation of institutions of higher education. This change is occurring as an inevitable reaction to changing times. Educational opportunity has expanded enormously in this country. We have moved in a few short decades from ten percent of the college age population attending institutions of higher education in Florida, for example, to a figure of almost fifty-three percent. I include in higher education both the community colleges and the universities. There has also been a tremendous change in the student body during the last few decades and in the background of the students in terms of family, economics, culture and interests. For example a survey of one of our upper division institutions revealed that very few of the students had any interest in the traditional arts and science majors. The students were oriented almost totally to vocational-technical or semi-professional career majors. The economic and cultural backgrounds of such students are likely to be different from those of students who are arts and science majors and their parents are likely not to be college graduates. Many factors influenced a second major change from residential to nonresidential students. Many larger universities which consider themselves residential now are in fact nonresidential in that only a small percentage of the students are housed on campus. The increase in both the number and percent of students living off campus has been accompanied by an increase in the number and percent of part time students. Frequently concepts of education built around the student living and studying on campus as a full time occupation have not changed. I suggest that the protest against *in loco-parentis* came in part from students living away from the campus. The average age of students has also increased dramatically. In summary, changes in the character, background, interests and goals of students make the student body very different from the student body of a few decades past.

Not only have the students changed but other changes have equally affected the universities. The centrism which has moved people from small towns and rural areas to vast urban centers has been working in our universities. If you reflect for a moment as to the size of a university twenty years ago and the current size of that university, this change is thrown into perspective. When as an Ohio resident I was contemplating attending a university I remember Ohio State as a massive institution of 10,000 students. I attended a much smaller institution of 2,500 students. That small institution now has 12,000 students and is still considered small. Ohio State, as a large university, enrolls in excess of 40,000 students. Manifold changes occur in the character of a university and its method of operation when such centrism, such growth, such urbanization, if you will, of the institution takes place.

Internally another change has been the increased emphasis on research. I will not expand upon this change since it has been discussed extensively except to say this is one of our glories and one of our curses.

In Florida the number of institutions of higher education has mushroomed. For forty years three publicly supported institutions served the state and suddenly there are nine. Nine institutions to fund, nine institutions to present their cases to the legislature, nine institutions with their constituencies.

In cataloguing the major influences, increased cost must certainly be given a high position. Before the war a professor of biology aspired to sole use of a $400 microscope. In the late 50's the acquisition of one electron microscope costing $150,000 was an event of major significance and elevated a university to the category of those who were seniors in their pursuit of research. Now such microscopes costing $300,000 are numerous enough so that they are departmental tools, not university-wide tools. Air conditioned buildings were a curiosity in the early 50's and some of the utility expense in connection with the operation of the university, therefore, was very different. From a host of causes the cost of education has escalated at a rate that is two and one-half times the rate of growth of the gross national product. If you extrapolate the rate of growth of the money devoted to research in universities in this country beginning about 15 or 20 years ago and extrapolate the rate of growth of the gross national product, the lines cross about the year 2000. This obviously is impossible. I heard someone comment the other night that when the cost of the master plan for higher education in California was projected to the year 2000, the resulting budget was greater than the budget of the United States at the time of the extrapolation. In Florida our projection, which caused a review of our plans, resulted in a budget by 1980 that was two and one-half times the current budget of the entire state of Florida.

Another major change which vitally affected the universities was our society's change to a knowledge based economy, accompanied by rapid obsolescence of that knowledge.

But what were we doing in our universities while these great changes were taking place both internally and externally? The pattern of thought of the faculty, the system of rewards, including that of the Federal government, the environment within which we operated all encouraged us to a heedless pursuit of the ideal of recreating a Harvard. I attended three dedications of universities in the space of about a year and each president, at the dedication, spoke about making his university the outstanding university in the nation. What did they mean by the best university in the United States? Best for whom? Best in what way? I submit to you the ideal was the model of the Yales, the Harvards, the Stanfords, the Chicagoes, the Berkeleys. Replication of that which existed was the menu of the period. The student to be served was the student of the past in an environment that no longer existed. The trend in this direction in terms of national policy may well have peaked in the center of excellence grants which tried to augment research at institutions throughout the United States. The grants were a political response to the charge that most of the federal research money was going to a few institutions. The center of excellence concept was in tune with the times and accorded with the idea that we should educate fifty-three percent of our college age population the same way the ten percent of the college age population was previously educated. It was an elitist response to a non-elitist situation. A statement as to where those policies led us may lie in the fact that student newspapers of some Florida universities recently carried ads of the public universities in California which attempted to entice students from this state to California for the summer session. This event occurred at the time we were making a major effort to increase our summer sessions. An examination of some of the trends will reveal an actual decrease in enrollment in many states and in specific institutions.

We are clearly in a very new ball game. Proprietary schools are flourishing. The military is placing more and more emphasis upon in-house education. The Navy recently consolidated its total education effort, placed a three-star admiral in charge of that effort and allocated a budget of over a billion dollars for education by the Navy in their institutions. Many major businesses now have significant education programs. IBM, the Bell System and General Motors are just a few of those which are well known. Proprietary and other non-public schools are flourishing in competition with inexpensive public education. It may well be that more students are now being educated in non-traditional endeavors than are educated in public and privately supported institutions of higher education.

Many of these thoughts crystallized when I was working with the capital outlay or building budget for our universities. The earliest we could occupy any of the buildings to be built would be 1976 and more probably occupancy would occur in 1978. As I began to look at the assumptions which underlay this request, I moved to the six-year budget projections of the universities. By and large they consisted of straight-line extrapolation with every institution planning to move from the bachelors, to the masters, to the Ph.D. degrees in inexorable progression. These budgets incarnated the mold from which we sprang. It is entirely possible that this kind of blind reproduction would lead to the exact opposite of the result we wanted – our goal being a system of distinguished universities serving the state and its citizens.

I hope I have made a case for research. I define research as a dispassionate, objective examination of facts and the facts in the example I cite is research into conditions which would enable the state to set a course that would not bankrupt it, that would serve its citizens, and that would provide a response and help shape the future.

If I have made a case in which all should have faith, how is that faith being manifested in Florida? What can be and what is being done? As a first cut we extrapolated the results of continuing to implement our present assumptions. We projected numbers of students, costs, size of institutions, and related fundamental operating results for the next decade. These results were matched against a series of manpower studies. These two studies have been the basis for a number of policy discussions which have far reaching impact. We next began to think about the distant future. What kind of universities are going to be required for the year 2000? What kinds of educational opportunities will be needed? What kind of service should we as educators be performing in the year 2000? Very little literature exists on this subject. The reason may be that it is extremely difficult to think about the year 2000 in a constructive and realistic manner. If you contemplate that far distant future, it becomes cloudy. Precision is lost, but you become aware that we won't be doing all the same things we are doing today in precisely the same quantity and with the same methods. You begin to wonder if a building for which you are now planning and which will be built and occupied in 1978 and will be used until at least 2028, should really be built where it is presently planned to be built in the form in which other buildings have been built.

The result of these efforts was to deepen our commitment to the concept of upper division universities. These had begun as an add-on to our community college system, but took a slightly different shape when we began our research and looked to the future. President Charles Perry, who is seated at the head table and was presented to you, is president of one of our responses. He is undertaking to chart some new courses. He will open Florida International University in the fall of 1972 as a university planned to have multiple campuses. This decision represents an attempt to bring education to the people, to build universities attended by commuters to avoid the massive concentrations of people and buildings which we now experience. The university may very well be larger than any other in the state but each campus is going to be substantially smaller. His charge was to respond to the educational needs of the community. We have decentralized to him the responsibility for determining those needs and the shaping of programs to accommodate them. He is on the scene, he knows what is required, and he and his faculty can respond much more completely, accurately and meaningfully than can a central office. With this charge and this freedom he has shed some of the snobism which has accompanied our attempts to replicate the universities from which we graduated. Florida International University will establish career oriented programs which would not have been acceptable in universities a few years ago. We are proud of those programs and proud of President Perry and his faculty for his response to the general charge. He has determined their needs through surveys, advisory committees and other forms of research.

What are the exciting research opportunities along this course we have chosen? To commit millions of dollars, the careers of many, the future of others, we need to have facts to guide us. What should be the size of a campus? What impact does our fee structure have upon our related goals? I have a visceral reaction that our fee structure now is oriented to accommodating residential full-time students. If we are going to be responsive to the needs of the community, do we need to conceive of a fee structure that will permit a person to take one course without penalty? It is important that our fee structure encourage the worker who has become technically obsolecent to drop back in? The dean of a college of engineering told me he had attended a university three times. He first trained as an aerospace engineer for subsonic planes. When planes began to exceed the speed of sound, a new set of knowledge was required and he returned to the university and was trained for sonic airplanes. Finally when planes began to be designed for Mach 2 speed and missiles for speeds of 17,000 miles per hour, a third training was required. Whether training that narrow and that specialized is warranted may be debatable, but the fact is our society demands such training and the fact is that the demand is going to continue and indeed may accelerate. So educational opportunities must be provided for people who must continue working and earning a living. Older, married, working people must be able to drop back into the educational cycle to retool and refurbish their skills. Which leads to another conclusion, namely, we must shed some of our concepts of who should be able to attend a university if we are going to serve society. Changing that concept may well require a change in some of the lockstep features which now characterize our educational system.

One response to the new needs is an external degree. I am pleased to report that Florida International University will operate a program leading to an external degree. That is to say, a prospective student whose business takes him to various parts of the United States for short periods of residence may work out a program which will enable him to obtain a degree. That man may receive a degree if he follows that program and passes certain tests without having come to the campus of Florida International University. Is this concept good or bad? We don't know, but we are willing to try to meet some of the needs of a modern mobile society by using this device on an experimental basis.

Which brings me to the thesis of this talk – centralization, friend or foe. All decision making must be a series of interactions between those who eventually raise and allocate resources and those who must be relied upon for day-to-day operating results. I once heard a story of a president of a large company who decided to tour his plant. The first man in the production line was operating a machine in accordance with the rules which required use of the right hand. After the usual pleasantries between the president and the worker, the president asked the worker if he had any suggestions for improvement in efficiency. The worker passed off the inquiry as polite and perfunctory. When the president persisted, the worker finally responded with, "Well for a start, I am left handed." This story well illustrates the point that planning cannot be in a vacuum and that it must bear some relation not only to broad goals, but to the capabilities and desires of those who accomplish the goals. At the same time the worker cannot work at his own pace on his own project if he is to be at his most productive in terms of societal needs and in terms of producing something for which society will reimburse him in order that he may supply himself with his needs.

A central office has an enormous advantage in overall objective perspective, in its ability to establish a system of rewards to encourage desired patterns of behavior, in its ability to forecast on a global scale, and in its ability to provide political buffering and insulation from myopic local influences. The inauguration of an external degree at Florida International University for example was made easier because of the existence of a central office which encouraged such action and which laid the necessary groundwork. The clinching arguments for support of such a program and the reward structure which will give it an opportunity for success can only come from a central office. At the same time a central office has no possibility of writing the details which grant an external degree the potential for success.

Any administrator, be he department chairman, dean, president or chancellor, walks a razor's edge one side of which is called "policy" and the other "implementation." Few would disagree that implementation should be at low echelons of administration or that policy determination should be at higher echelons. Definition of whether an act is policy or implementation is another question. I was recently informed that the most difficult languages in terms of ability to communicate are the most primitive ones. In a primitive language which has few words, every word has multiple meanings. Similarly in communicating in English it is easier to agree if one is at a high level of abstraction than if one is discussing details. The relationship between any office such as mine and the universities is one in which both sides must be tolerant and understanding and willing to bring disagreements quickly to the table for discussion. It is one which must avoid the antagonist role and work cooperatively. Centralization is neither friend nor foe. It is a fact. It is a growing force at the policy making level. The same may be said of decentralization which is increasingly recognized as desirable in the area of operation. Individuals working cooperatively can avoid the pitfalls of a relationship which is necessitated by an insistent demand to bring order and constraint to our operations. In the final analysis all relationships which endure and bear fruit must be partnerships; a relationship which is something more than a friendship and which is certainly substantially less than a foe. Finally, it is increasingly evident that the numbers of individuals and dollars with which our society must now deal cannot be dealt with rationally solely on the basis of partners working with a common goal, but in addition require hard facts rather than high level abstractions or primitive words which have numerous meanings. Research increasingly must become concerned with not only the minutiae of performance in an institution and profiles of student bodies, but also must be concerned with career objectives and the broader policy questions with which education must increasingly deal. I congratulate you upon the breadth and depth of your program. It is apparent that you are concerned with the manifold changes. No, concerned is the wrong word. It is apparent that you are aware of the course of events and intend to be a working partner in the team which helps influence this course.

OPEN ACCESS – A CLUE TO REFORMATION AND REALLOCATION

Harold L. Hodgkinson
University of California, Berkeley

I

Let me begin with a few observations on the current cultural scene. I hope that these will set the stage for the discussion to follow. First, it should be clear that this is a period of declining faith in American social institutions, as Table 1 indicates. In the short period from 1967 to 1972, faith in a variety of institutions showed drastic drops in a national Harris poll. Only the medical doctors survived (and I have some personal doubts about *them*). The concern with student protest has masked a tremendous increase in anti-institutional activity in many areas of American life, from priestly marriages to illegal, wildcat strikes. One reason for this decline in faith in institutions can be seen in Table 2.

TABLE 1

Harris Poll – Percentage of Americans Who Express Faith in U.S. Social and Political Institutions, 1967 and 1972

	1967	1972
1. Faith in Leadership of Major Business Corporations	55%	27%
2. Faith in Banks and Other Financial Institutions	67%	37%
3. Faith in the Military	62%	27%
4. Faith in the Congress	41%	19%
5. Faith in the Chief Executive	41%	23%
6. Faith in the Scientific Community	56%	32%
7. Faith in Medical Doctors	73%	61%

(*Social Education*, March, 1972)

In some dimly perceived, seldom verbalized way, I believe that many Americans are coming to see that the enormous problems on the right of this chart are *caused* by the social institutions on the left, and that to some extent this relationship cannot be altered very much. Thus, our "crowning glory" as a society, seen in the left-hand column, is also responsible for the social problems that could cause our demise as a society. As a result, some are even beginning to question the concept of "progress," which is about as un-American as you can get. (For example, Edward Banfield's little book, *The Unheavenly City*, has been banned from several campuses for taking the position – well documented – that the more we do for American cities, the worse they get.)

We are having great difficulty in diagnosing this problem, partly due to our reflexive way of going about it. Being reductionist in nature, and seeing society as a single great machine, we approach the problem as we would a car that won't start – find the *single* component failure and the problem will be solved. Unfortunately, *societies* do not seem to work that way. To a degree, the reductionist ethic which has produced our marvelous technology produces a kind of trained incapacity which makes it impossible for us to see large-scale entities as *wholes.* In psychology, for example, the reductionism of B. F. Skinner and others quickly gained status over the work of the gestaltists like Köhler, who were trying to understand the entire human perceptual field as one entity. (Today, there is an interesting resurgence of interest in humanistic psychology, although most institutional research people have little background in this area.) Also, we find acupuncture unexplainable because we are assuming that the needles inserted by the doctor act on a *specific* nerve or muscle, when in actuality they may be affecting the *whole person simultaneously.*

Because of our belief in reductionism, we are as a people singularly weak in assessing our own culture. Outsiders like de Tocqueville can usually do a superior job.

II

As a way of relating this discussion to higher education, consider the majority view that in American society there are certain specialized institutions which are concerned with educating the young, and *no other institutions* carry on this function. (After all, you wouldn't expect a carburetor to produce ignition, or a gall bladder to pump blood, would you?) Table 3 reveals how wrong the reductionist, or specialization, notion is. "We" are involved with the educational *core,* consisting of elementary and high schools, colleges, and universities. It is clear that large numbers of people are engaged in organized educational activities in this country, but not in the core at all. The periphery is gaining in numbers every day, especially in terms of *organizational* activity, including industries like IBM, Xerox, Kodak, and others which have discovered that they can retrain and upgrade their personnel far more effectively if *they* run the programs.

This is only the beginning of a trend toward dispersing educative functions out into a wide variety of social institutions. We also have the universities without walls (a number of which are now in operation, including the UWW, Empire State, Campus-Free College, Metro State, and Walden University), programs to extend the campus to all age levels, and the satellite or "franchise" development. In addition, *The Whole Earth Catalogue* began a revolutionary new pattern of "access to tools" without an *intervening institution.* Today, if one wishes to get involved in some kind of educational activity, he can simply consult the *People's Yellow Pages* in order to find out where in his locale he can find it. About ten of these educational Yellow Pages now exist, providing an astonishing array of educational activities, most of them free. Thus, although we are told that the decade of the 70s

TABLE 2

"Successes" of the technological era	Resulting problems of being "too successful"
Prolonging the life span	Overpopulation; problems of the aged
Weapons for national defense	Hazard of mass destruction through nuclear and biological weapons
Machine replacement of manual and routine labor	Exacerbated unemployment
Advances in communication and transportation	Urbanization; "shrinking world"; vulnerability of a complex society to breakdown (natural or deliberate)
Efficiency	Dehumanization of the world of work
Growth in the power of systematized knowledge	Threats to privacy and freedoms (e.g., surveillance technology, "bio-engineering"); "knowledge barrier" to underclass
Affluence	Increased per capita environmental impact, pollution, energy shortage
Satisfaction of basic needs; ascendance up the "need-level hierarchy"	Worldwide revolutions of "rising expectations"; rebellion against "non-meaningful work"; unrest among affluent students
Expanded power of human choice	Management breakdown as regards control of consequences of technological applications
Expanded wealth of developed nations	Intrinsically increasing gap between have and have-not nations
Development of prepotent high-technology capability	Apparent economic necessity of continuous war to use up the output of the "megamachine"

(From Willis Harman)

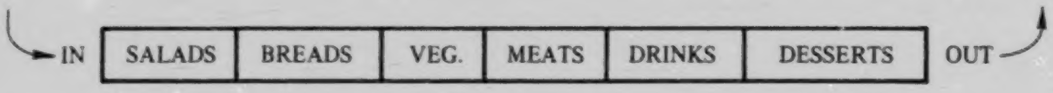
TABLE 3

The Learning Force (1940 – 1976)

(Millions)

		1940	1950	1955	1960	1965	1970	1976
I.	The Educational Core							
	1. Pre-primary	.7	1.3	2.0	2.7	3.1	4.4	5.5
	2. Elementary	20.5	21.0	26.0	29.1	32.0	32.3	30.0
	3. Secondary	7.1	6.5	9.3	13.0	16.8	19.8	22.1
	4. Undergraduate	1.4	2.4	2.4	3.2	4.9	6.5	8.3
	5. Graduate	.1	.2	.2	.4	.6	.8	1.1
	Sub-Total	29.8	31.4	39.9	48.4	57.4	63.8	67.0
II.	The Educational Periphery							
	6. Organizational	8.2	10.2	10.9	13.0	14.5	21.7	27.4
	7. Proprietary	2.5	3.5	3.5	4.0	7.8	9.6	18.1
	8. Anti-Poverty	–	–	–	–	2.8	5.1	7.0
	9. Correspondence	2.7	3.4	3.5	4.5	5.0	5.7	6.7
	10. TV	–	–	–	.01	5.0	7.5	10.0
	11. Other Adult	3.9	4.8	5.1	6.8	9.1	10.7	13.2
	Sub-Total	17.3	31.4	23.0	28.3	44.2	60.3	82.4
III.	The Learning Force (I + II)	47.1	53.3	62.9	76.7	101.6	124.1	149.4

TABLE 4
A Conventional Cafeteria



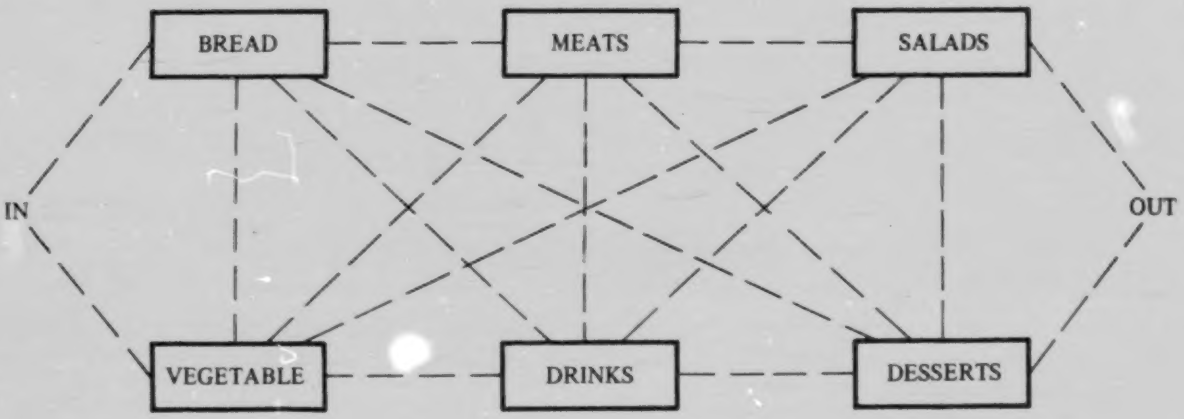
will be a "zero-growth" period for higher education, or nearly so, the involvement of Americans in educational activities *not* related to colleges and universities will show a spectacular increase.

Throughout the 60s, we in higher education were expanding like real estate developers, with all the conscience of a suburban development builder who leaves town before the roofs leak and the roads turn to mud. (In a study I did for the Carnegie Commission in 1969, almost all of the 1,230 presidents of colleges and universities saw growth as the *solution* to their problems, even though the evidence now suggests that growth of institutional size is far more often a problem than it is a solution – for example, the correlation of increased institutional size with increased student protest was *very* high in these data.) This single-minded concern for increased institutional growth as the way to "greatness," with no awareness of what other institutions in our culture were doing educationally, was a major error. For example, we have been building a new community college in this country every week while studiously ignoring the proprietary institutions which might – had they been eligible for accreditation – have taken over many of the community college functions, with a large saving of public monies.

III

From here out, our planning *and* our institutional research must take into account this great diversity of educative options that exist, some within "higher education" and some in other places – all of potential use to individual students. How can we adapt ourselves and our institutions to make better use of these educative opportunities? Here is a metaphor which may provide a clue. Consider first a conventional sort of cafeteria line as in Table 4. Note that the line is a one-way, linear, bounded system. One is not allowed to go back – the line penalizes people who didn't get what they wanted on the first try. The *sequence* of choices is dictated by the line, not by the persons moving through. Now consider an alternative arrangement, usually referred to as the *open access* cafeteria, now in operation at a number of major industrial firms, including Motorola and USOE (Table 5). Here, the customer is free to move from any station to any other with no penalties for "going back"; indeed there is no such thing as "going back." Although this arrangement appears chaotic, it is actually about 20% more efficient in terms of customers per hour than the straight-line model. When this new arrangement was presented to a group of cafeteria managers, their response was interesting. Almost to a person, their feeling was that the new system was immoral. When pressed, their attitude was that the new arrangement provided too much freedom of choice and as a result people would take nothing but desserts! They saw the straight-line model as a moral structure in that it *forced* people to go past the things that were good for them. (Their view is, of course, unsupported by the facts – desserts are chosen no more and no less in one system than in the other.)

TABLE 5
A Random Access Cafeteria



The models have real importance for our thinking about higher education. At the moment, we operate mostly in the straight-line model (freshmen may not take junior courses; you can't take Shakespeare until you've had Chaucer). In the future, we will have to move to something like the open access model, even though registrars may not like it very much. But we don't run colleges for registrars, we run them for students and faculty.

IV

Each of the two models presented has its imperatives for reformation and reallocation. The linear system can handle things by taking some money from one segment and giving it to another, usually through the medium of exchange known as the *quid pro quo*. In the linear model, the benefits of reallocation tend to accrue to the single unit increased; in open access, benefits can rebound throughout the system, due to the diversity of some of the parts, and the large degree of serendipity possible.

Let's follow the open access model to a specific – that of faculty "productivity." As I am sure you know, the two major criteria for faculty productivity are student credit hours generated and degrees produced per FTE faculty member. The student credit hour has become the major unit of academic bookkeeping, yet it has one flaw – it has little or nothing to do with education. Similarly, we assume that faculty load is only related to those activities that generate these credit hours – teaching courses. But let's open up the process by looking at *all* the activities teachers engage in that may have an educational impact on students (Table 6). If we do this, we could get a much more realistic picture of faculty load in an educational context. In this example, faculty activity has been translated not into clock hours but into arbitrary units of intrinsic worth. We can refer to them as "teaches" and say that 30 of them comprise a full-time load. Note that you cannot get there by simply teaching three courses. Thus, the system can calculate the *total* educational contribution of each faculty member, and can give some estimate of how the total faculty is engaged. One could also calculate the relative amount of effort given to advising, for example, by department, and could use reallocation to reinforce certain activities of faculty that needed strengthening. (A next step might be to develop a similar list of educative activities for *students* – the base unit could be called "the learn" – and then begin putting the two systems together to see how many "teaches" produce how many "learns.") Also, this model would lead naturally to the notion that some faculty are better at certain activities than at others, perhaps allowing some faculty to concentrate on advising, other faculty on lecturing, still others on seminars, etc. This result could produce a degree of differentiated staffing among faculty – a real advantage if we accept the notion that students can learn in a variety of settings in addition to the classroom.

TABLE 6
Functional Faculty Load Calculation – "The Teach"

Full Load = 30 Teaches (*Not* Hours)

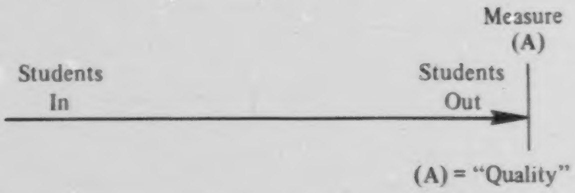
Studio Course	= 4 Teaches
Seminar Course	= 5 Teaches
Science Lab + Lecture Course	= 7 Teaches
Advising 5 Freshmen	= 1 Teach
1 Independent Study	= 1 Teach
Chairing Department	= 3 Teaches
Service on Major Committee	= 2 Teaches
Advisor to Student Activity	= 1 Teach
Advising 2 Seniors	= 3 Teaches
Chairing Division	= 4 Teaches
Directing Play, Art Show	= 4 Teaches
Producing Concert	= 2 Teaches
Coaching Major Sport	= 1 Teach
Coaching Minor Sport	= 3 Teaches
Preparing New Course	= 4 Teaches
Departmental Orientation	= 2 Teaches

What are the implications of open access for institutional research? If we are to assume that IR offices exist to do analytical studies of the institution itself, the implications are many. First, we might want to develop a series of "value-added" measures of when and where learning really takes place (Table 7). We usually measure learning at the end of the semester or year, usually the worst time to measure it if we want the measurement *to help the student to improve his performance*, and I would argue that this is a chief function of all assessment. With initial measures at the *beginning* of the cycle, compared to measures during the interval as well as at the end, we can develop *ratios* which would show the *increment* of learning gains. This can be done for any area in which we can define what we mean by a gain, both cognitive and affective, on-campus or off-campus, required or elective, etc. Non-traditional forms of study will require non-traditional modes of assessing student learning, including the development of learning contracts with individualized evaluation procedures built into each one, the use of student logs or diaries, notebooks, ethnographies, "snapshot" techniques (both pictorial and written), use of supervisors' estimates for internships, simulations of actual situations in which the student can actually demonstrate his new skills, plus a host of others. One has to say that institutional research professionals have not been on the forefront of the development of these new assessment techniques; indeed, one wonders if they are aware of this development.

Or let us assume that we are interested in *when* during the quarter or semester learning takes place. In this study, a series of weekly tests were given, rotated around the class so that no students got the same tests in any two weeks, in a large required course in natural science (Table 8). This chart shows that virtually no learning takes place until the mid-term, and even then nothing much happens, as after the mid-term the curve stops going up. In the 14th week, the section leaders all told the students that unless they got busy, they would all flunk the course. Although B. F. Skinner asserts that negative reinforcement is unsuccessful, we have here living proof that threats do work. The students learned. But now, let's follow these students for the following semester to see how long they retain the material (Table 9). As is

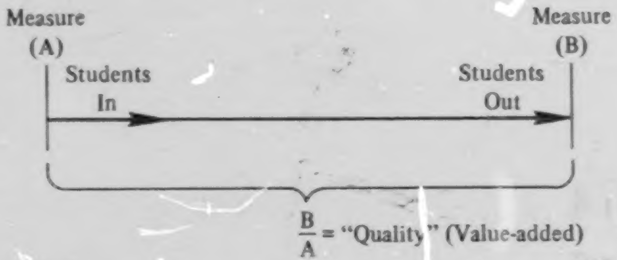
TABLE 7
Value-Added Measures

"Quality" I – Measured at Output:


Measure
(A)
Students
In
Students
Out
(A) = "Quality"

In I, quality of input determines "quality" of program.

"Quality" II – Growth ratio of output over input:


Measure
(A)
Students
In
Measure
(B)
Students
Out
B/A = "Quality" (Value-added)

In II, Quality of input does *not* determine quality judgment of program.

$\frac{B}{A}$ for each major (GRE subject tests)

$\frac{B}{A}$ for general education (all students or by majors)
(GRE area tests)

TABLE 8
Learning Curve, Required Natural Science Course, Non-Majors

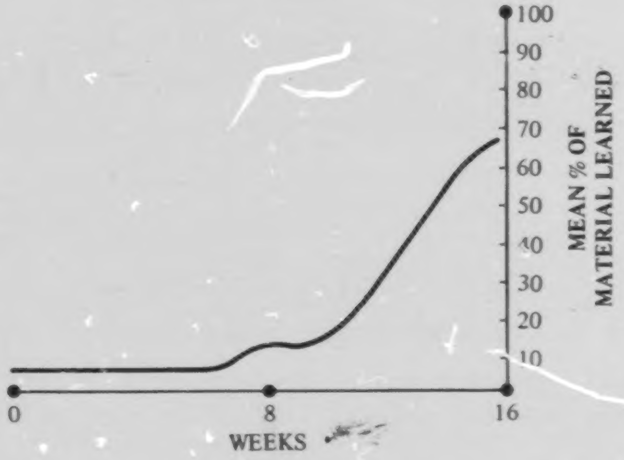


TABLE 9
Learning Plus Forgetting Curve. Required Natural Science Course, Non-Majors

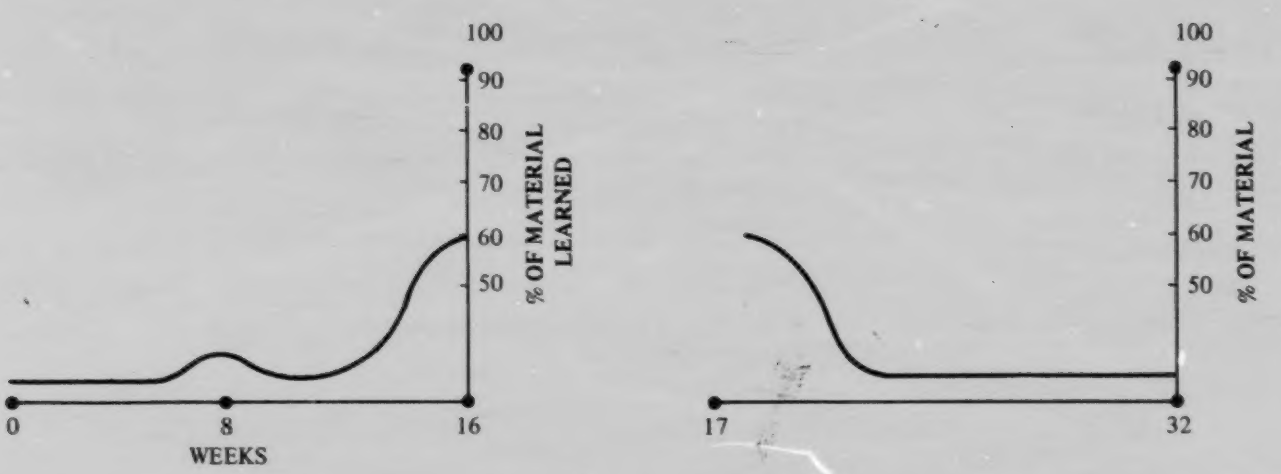
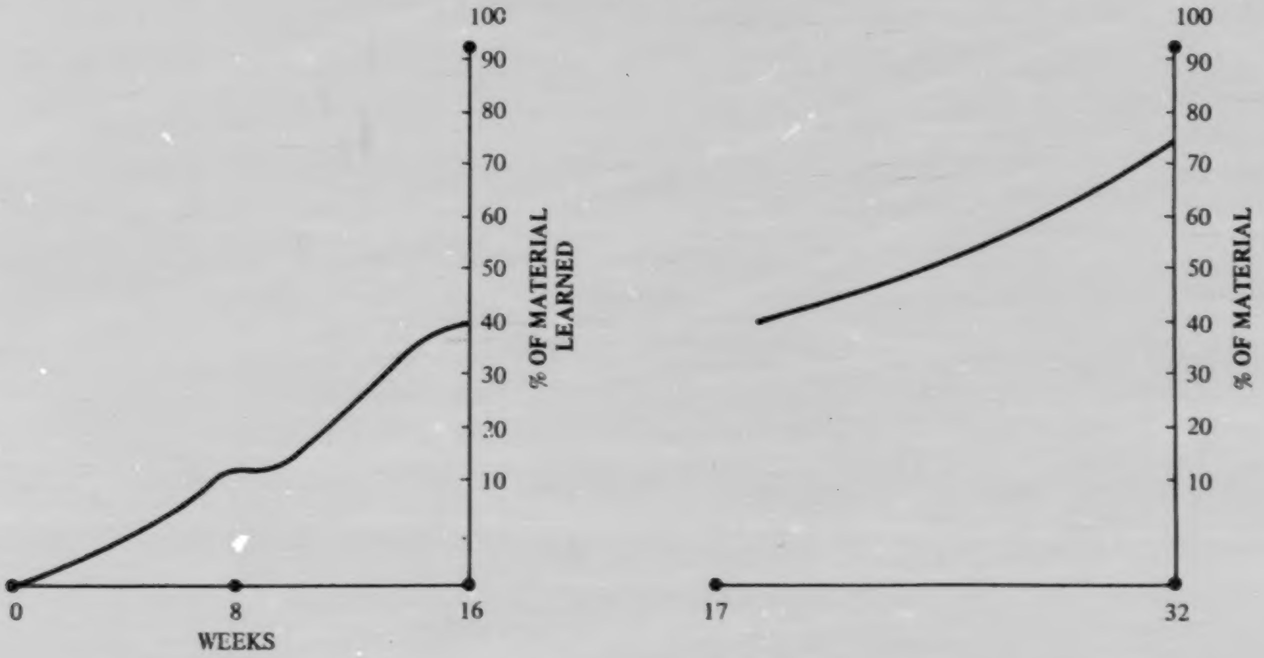


TABLE 10
Learning Plus Forgetting Curve, Elective Course in Philosophy of Religion



clear, the shape of the learning curve is matched by the rapid fall of the forgetting curve, ending up 32 weeks after the start with very little to show for it; yet the instructors insist that this material is essential for every American citizen in order to vote intelligently on matters of science policy. (Our data would suggest that all national elections must be held between the 16th and 17th weeks of school, as that's the only time the students know the stuff.) Now let's look at one other course, this time a smaller elective course in philosophy of religion (Table 10). Unlike the natural science course, the teacher is there because he wants to teach the course, the students are there because they want to take it. Although the learning curve is not spectacular during the course, note what happens during the following semester. The students show major gains in the subject matter even though they aren't taking a course in it at the time! It is clear that in a variety of ways we can now demonstrate that students show major gains in subject competence without taking courses in that subject area. For example, middle class children of elementary school age will show one month's gain on standardized tests for every month they are on summer vacation; while lower class students show a slight decline during the summer. The middle class home seems to foster learning more than the lower class environment. At this stage you may say, what does this have to do with institutional research? The answer: it should have *everything* to do with institutional research, if we are concerned with providing an environment in which students can learn effectively, in class and out, as well as providing data that can serve as a basis for both reformation and reallocation. The power of institutional research in terms of providing the parameters within which institutional decisions are made, is enormous.

There is one problem with these parameters, however, and that is that they do not currently represent the techniques and values of the "softer" side of social science, including anthropology (techniques of field work, including ethnography) and sociology (particularly participant observation, as exemplified by the work of Becker and Geer; the dramaturgical school, represented by Irving Goffman; the awareness context group and social interactionism, as in the work of Glaser and Strauss; the use of unobtrusive measures, as in the work of Campbell and Webb; and the social indicators movement, as in Bauer's work).

As we move toward greater involvement in new kinds of institutional activities, the parameters of institutional research will have to become more open also, including competence in some of these newer methodologies that have great potential for institutional assessment. By and large, institutional change comes about when we start thinking about it in new ways. This is one reason why change in higher education often occurs when an institution adopts a new calendar, when it selects a new president, and when it moves to a new site. These activities free us to rethink what the institution is, as well as what we are doing in relation to it. Change is fundamentally a shift in our perception of what is possible. When one of Köhler's apes ripped off a tree branch in order to reach food that was beyond the reach of his arm, he could never again see a tree as he had before – every tree now became a collection of food-getting implements – forks and spoons, if you will.

For example, what happens if you assume that undergraduates are perfectly capable of doing institutional research in higher education, in terms of conceiving and carrying out research designs? Among the possible answers are the undergraduate research program at Principia College and the proposed undergraduate center for research and dissemination in higher education at the University of California at Davis. One could also move to student internships in IR offices as at the University of Alabama. (In the Campus Governance Project, funded by Kettering, we used undergraduates on every interviewing team, and their insights were indispensable.)

Or, let's assume that social science faculty represent a huge array of talent which could be used in increasing the utility of institutional research by focusing that talent on the institution itself. Out of this might come courses on the college, research on college characteristics carried out by faculty, students, and IR staff working together, using a variety of research strategies and data sources. What about IR staff whose expertise was in anthropology or social psychology? What could *they* add to institutional research?

It occurs to me that, in the past, IR offices have acted to impede change by reinforcing the parameters that lock in present practice. It would be interesting to imagine an IR office deliberately designed to *facilitate* institutional change. What could it look like? How would it function?

I have no answer to these speculations, but it might prove interesting for you to consider them. If anything will ruin higher education, it is the retrenchment mentality now so pervasive in higher education. What is needed are new ways of conceiving of problems, new conviction that we can do many things that will cost almost no money and yet may improve the quality of higher education immensely. Institutional research could help us move toward this new spirit, or it can continue in the mode described by Auden as "lecturing on navigation while the ship is going down." It's pretty much up to you.

COSTING GRADUATE EDUCATION PROGRAMS: SOME EMPIRICALLY BASED CONSIDERATIONS[1]

John W. Alden
University of Vermont

INTRODUCTION

Virtually all colleges and universities in the United States have financial problems in one form or the other. These problems along with other reasons have heightened the interest in more efficient management of institutions on the part of governing boards, coordinating councils, institutional administrators, and others. This interest has prompted a more intensive search for new and more elaborate forms of cost analysis for educational programs. The research reported in this paper developed out of the belief that continued effort must be aimed toward developing new means for determining the costs of educational programs, while casting a continued, skeptical and critical eye at our present and developing methodologies.

The fundamental thrust of this research stems from one important limitation of unit costing and resource planning models for graduate education programs. The use of instructional credit hours as the basis for expressing costs of graduate education programs may be particularly suspect since such units may not reflect the indirect or non-instructional activities of graduate students. Graduate students use institutional resources that may not be related to direct instructional loads. For example, use of laboratory space by advanced graduate students performing research may not be realistically reflected by credit hour cost data for the department in which these particular students are enrolled.

Furthermore, models deriving basic relationships from instructional load data may also be limited in the ***indirect*** or non-instructional area. Institutional researchers and others simply do not have data to describe more accurately the components of graduate education and how they should be interrelated for costing purposes. Thus, to reiterate, instructional credit hours may not be the correct proxy upon which to derive graduate education program cost. The following is a brief review of a research project aimed at overcoming this limitation of costing and modeling techniques.

The research purposes were: first, to determine the extent to which graduate students utilize major resources provided in support of their educational programs excluding direct classroom instruction; second, to describe and analyze the differential resource utilization among graduate students in various disciplines and levels of study at a major research university. The overall objective of this research was to produce a more accurate and thorough understanding of the components that make up the cost of graduate education. The methodology developed for this research is probably unique, certainly novel, and hopefully an advance in the state of the art. A complete description of this research is available.[2]

RESEARCH DESIGN

The basic research design was a multiple-wave panel survey employing an extensive diary for data collection. The data were collected on graduate student utilization of several minor university resources and five major resources. The diary was designed for simple and accurate recording of students utilization of major resources. In addition to the amount, the purpose of utilization was asked. Major sections of the diary were developed for libraries, computers, employees, classrooms, and laboratories. In addition to these sections of the diary, a general section solicited background information. A random sample stratified by HEGIS disciplines and student level was selected from the 9,000 plus graduate students enrolled for fall semester at the university being surveyed. It was determined that a sample of approximately 1,900 students would be required to generalize to the population. In order to control for nonresponse, over-sampling was employed. The complete diary and sampling techniques are described in detail elsewhere.[3]

Each student from the initial sample of 3,748 students was randomly assigned to one of nine weeks during the first semester, Fall 1970-71. When the survey began, a diary was mailed to each of the students in each weekly group. Extensive steps were taken to encourage a high response by providing a thorough understanding of the research project. During the course of nine weeks of surveying, approximately 1,800 students returned a completed diary. The following provides an overview of the major findings.

RESULTS

Four resource centers will be discussed. They are: employee time (faculty, staff, and administrators), libraries, computers, and laboratories. For each resource center, the results are reported in terms of the ***proportion*** of students who used a particular resource and the ***amount*** of that use expressed in weekly averages. It should be underscored that these averages are calculated on the basis of the data reported for the user group only. The zeros from the non-users were *not* included in the calculation. A statement that "50% of the students were library users" means that one-half of the respondents utilized the library at least once during the week in which they were surveyed. The users of each resource will be analyzed on two dimensions: level and discipline of study. Level of study divides students in three groups, masters and professional students (law and veterinary medicine), pre-prelim doctoral students (before completion of course work and preliminary orals) and post-prelim doctoral students (after completion of course work and preliminary orals). Students were classified by area of study into the HEGIS discipline divisions yielding 20 different groups.

EMPLOYEE TIME

Graduate students differ in terms of the proportion and amount of use of university employees' time. Statistical differences were found in two of six tests as noted in Table 1.

Masters and professional and pre-prelim doctoral students have a higher proportion of use of faculty time than post-prelim doctoral students. The same pattern is true for administrator's time but not secretarial and professional (staff) time. The proportion of students utilizing staff time increases from masters and professional students to post-prelim doctoral students. For each group of employees, masters and professional students use more time than do doctoral students, either pre-prelim or post-prelim. Apparently, the student-employee relationship is less intense at the doctoral levels of study.

TABLE 1
Students Using Faculty, Administrator, and Staff Time by Three Levels of Study

VARIABLE AND COMPARISON		%	$\bar{X}$
Faculty Time:			
All Students	(N = 1763)	.693	242.7
Masters and Professional Students	(N = 980)	.687	260.0
Doctoral Pre-prelim Students	(N = 580)	.743	222.0
Doctoral Post-prelim Students	(N = 203)	.567	219.0
		*	+
Administrator Time:			
All Students		.100	134.6
Masters and Professional Students		.098	164.3
Doctoral Pre-prelim Students		.114	117.2
Doctoral Post-prelim Students		.074	21.8
		+	+
Staff Time:			
All Students		.446	149.6
Masters and Professional Students		.491	178.0
Doctoral Pre-prelim Students		.488	121.8
Doctoral Post-prelim Students		.502	114.6
		*	+

* Significant at alpha = .05
+ Not statistically significant $P \leq .05$
% = Proportion of users
$\bar{X}$ = Amount of use – mean minutes/week

The proportion of graduate students using employees time and the amount of use also differs considerably among the various disciplines of study (see Table 2). Less than half (48%) of the law students recorded time spent with faculty members while 89% of the physical science students recorded time with faculty. The variation in time spent with administrators was not marked and the proportions of student users was small. Marked differences among the disciplines of study occurred in the reported use of staff time. Only 23.5% of the law students recorded time spent with staff members while 66.3% of the physical sciences students recorded such interactions. In terms of the amount of use, no fundamental pattern emerges and statistically significant differences only occurred for faculty time. The social science students were the lowest users of faculty time while health profession students were the heaviest users.

Perhaps the most striking result is that of 1,748 students reporting, only 71% reported having spent any time with university employees. It appears that generally students in the physical and engineering sciences tend to have a higher proportionate use of faculty time than students in the humanities and social sciences with law students having the lowest proportion of users and physical sciences having the highest proportion of users of faculty and staff time.

TABLE 2
Students Using Faculty, Administrator, and Staff Time by Discipline of Study

DISCIPLINE DIVISION	TIME SPENT WITH FACULTY %	TIME SPENT WITH FACULTY X̄	TIME SPENT WITH ADMINISTRATORS %	TIME SPENT WITH ADMINISTRATORS X̄	TIME SPENT WITH STAFF %	TIME SPENT WITH STAFF X̄
Agriculture and Natural Resources	.774	238.9	.119	38.5	.571	181.3
Architecture and Environmental Design	.875	352.3	.104	32.0	.542	104.8
Biological Sciences	.866	309.6	.062	142.5	.588	235.3
Business and Management	.596	223.1	.158	266.2	.421	124.2
Communications	.831	195.0	.143	40.0	.506	111.6
Computer Science	.662	244.0	.074	38.0	.515	231.3
Education	.628	229.4	.149	210.0	.446	102.7
Engineering	.796	188.4	.106	41.0	.472	118.9
Fine and Applied Arts	.675	471.7	.091	1073.4	.390	646.1
Foreign Languages	.594	167.6	.109	54.3	.406	28.3
Health Professions	.614	643.9	.140	91.3	.298	342.1
Home Economics	.765	441.9	.059	243.5	.412	188.1
Law	.480	174.8	.098	35.0	.235	99.5
Letters	.618	206.5	.039	242.0	.408	134.7
Library Sciences	.630	129.2	.118	44.6	.370	206.9
Mathematics	.614	122.8	.045	31.3	.386	53.8
Physical Sciences	.898	230.3	.061	20.0	.663	93.6
Psychology	.782	270.4	.059	86.3	.535	70.6
Public Affairs and Services	.596	221.7	.158	54.7	.368	51.2
Social Sciences	.646	121.0	.049	13.0	.378	86.5
All Students	.693	242.7	.100	114.6	.446	149.6
	*	*	+	+	**	+

* Significant at alpha = .05
** Significant at alpha = .01
+ Means not statistically significant
% = Proportion of users
X̄ = Amount of use – mean minutes/week

LIBRARIES

In order to analyze library utilization, data reported from 38 branch libraries (including the main library) were aggregated into four variables as illustrated in Table 3. The proportion of students "using library tables" ranges from 38% for fine and applied art students to 88% for the law students. Heaviest users of library tables are law, library science, social science, and communication students. Overall, about 58% of the students said they spend time studying at library tables, averaging about eight hours of use per week.

The range in "checking out books" from the library is almost as wide, from 26% for health profession students to 65% for communication students. Similarly, "items used within the library" ranged from 35% of the engineering respondents to approximately 75% of the library science students. The amount of use represented by these variables is equally wide. From a summary of the data on the utilization of library resources, several important conclusions emerge: 1) course work is the major reported reason for using the library; 2) users differ significantly by level and discipline of study; and 3) masters and professional students and pre-prelim doctoral students report heavier use than post-prelim doctoral students.

COMPUTERS

Detailed data about students' utilization of the university computer facilities were recorded in the diary. Estimating the amount of time using a computer is a crude procedure unless the computer generates the time estimate. Thus, only those responses for which the actual job cost figures (calculated from computer generated time statistics) were reported are used in analysis. Because of the limitations in space, data on the use of computers are not presented. Only a few general comments are made.

Computer usage differs significantly between level of study with post-prelim doctoral students being heavier users of computers than masters or professional students. Significant differences occurred in the proportion of students reporting use of the libraries by level of study. One significant difference occurred in the *amount* of library use. By

TABLE 3
Students Using Library Services and Facilities by Three Levels of Study

VARIABLE AND COMPARISON		%	$\overline{X}$
Minutes Studying at Library Tables:			
All Students (N = 1763)		.540	479.4
Masters and Professional Students	(N = 980)	.635	532.3
Doctoral Pre-prelim Students	(N = 580)	.486	395.8
Doctoral Post-prelim Students	(N = 203)	.236	284.8
		**	**
Total Books Checked Out:			
All Students		.451	7.0
Masters and Professional Students		.460	5.9
Doctoral Pre-prelim Students		.479	8.9
Doctoral Post-prelim Students		.325	5.9
		*	+
Total Books Used in Library:			
All Students		.504	13.5
Masters and Professional Students		.550	13.9
Doctoral Pre-prelim Students		.483	13.8
Doctoral Post-prelim Students		.345	9.1
		**	+
Total Minutes Using Items in Library:			
All Students		.495	270.0
Masters and Professional Students		.538	310.3
Doctoral Pre-prelim Students		.483	229.7
Doctoral Post-prelim Students		.325	119.3
		**	+

* Means significant at alpha = .05
** Means significant at alpha = .01
+ Not statistically significant $P \leq .05$
% = Proportion of users
$\overline{X}$ = Amount of use – mean minutes/week

each of these eight measures, post-prelim doctoral students are consistently the least heavy library users. Masters and professional students and the pre-prelim doctoral students tend to be the heaviest users of libraries with course work given as the most frequent reason for use.

The proportion of library users and the amount of their use varies markedly by discipline of study (see Table 4). There are several discipline groups in which no student recorded computer use during any week of the survey. Forty percent of the computer science students recorded some use, a finding that would be much higher if all computers had been included in analysis. The bulk of students utilizing computer resources resides within the physical and natural sciences. However, it is worth noting that students in the social sciences, education, and business are also making relatively frequent and heavy use of the computer. While there is wide variation in the amounts of computer use, the differences are not statiscally significant.

LABORATORIES

The final resource reported on herein is the use of specialized agencies, such as laboratories, studios, shops, bureaus, and other specialized service offices. These facilities are utilized by students who have need of specialized support throughout the tenure of their graduate programs. At the university surveyed, use of some *383 different agencies*, laboratories, studios, etc., was reported by 26.9% of the respondent group. This part of the analysis is particularly confounding because of the variety of laboratories ranging from a small room containing a calculator to a large sophisticated service laboratory manned by a professional staff and containing extremely expensive equipment. Consequently, all time reported was aggregated and analyzed by level and discipline of study.

The proportion and amount of use of laboratories and

TABLE 4
Students Using Library Services and Facilities by Discipline of Study

DISCIPLINE DIVISION	STUDYING AT LIBRARY TABLES[a]		TOTAL BOOKS CHECKED OUT		TOTAL BOOKS USED IN LIBRARY		USING ITEMS IN LIBRARY[a]	
	%	$\overline{X}$	%	$\overline{X}$	%	$\overline{X}$	%	$\overline{X}$
Agriculture and Natural Resources	.464	299.8	.476	5.4	.512	16.3	.524	262.7
Architecture and Environmental Design	.708	409.0	.646	5.8	.646	8.8	.583	187.1
Biological Sciences	.423	260.9	.485	6.4	.505	10.7	.474	145.2
Business and Management	.596	533.6	.535	6.2	.535	9.1	.544	296.5
Communications	.636	667.2	.649	7.5	.597	13.0	.584	475.7
Computer Science	.368	152.0	.456	3.7	.441	5.6	.382	105.7
Education	.471	304.4	.331	11.2	.355	18.6	.397	231.7
Engineering	.403	254.4	.458	3.9	.352	7.2	.345	115.8
Fine and Applied Arts	.377	469.7	.455	8.3	.390	12.1	.390	261.4
Foreign Languages	.563	492.1	.500	6.3	.578	10.0	.609	303.2
Health Professions	.719	342.3	.263	3.3	.351	5.3	.316	135.5
Home Economics	.412	346.0	.412	4.7	.441	6.5	.441	223.7
Law	.880	776.9	.304	8.3	.686	17.0	.667	360.1
Letters	.421	465.3	.487	24.5	.447	29.6	.434	182.4
Library Sciences	.748	755.1	.630	5.9	.765	28.5	.748	549.4
Mathematics	.557	273.7	.330	2.9	.386	6.0	.364	99.7
Physical Sciences	.500	270.3	.337	2.9	.643	9.2	.612	166.0
Psychology	.485	359.5	.386	3.1	.446	7.3	.475	229.3
Public Affairs and Services	.482	346.0	.395	8.8	.491	13.2	.456	265.4
Social Sciences	.561	735.7	.549	7.8	.500	11.0	.500	245.8
All Students	.540	479.4	.451	7.0	.504	13.5	.495	270.0
	**	**	**	+	**	**	**	**

** Significant at alpha = .01
+ Means not statistically significant P≤.05
% = Proportion of users
$\overline{X}$ = Amount of use – mean/week
a Units expressed in minutes

other specialized agencies is somewhat higher for students who have passed their preliminary examinations (see Table 5). Post-prelim doctoral students have the highest proportion of users of laboratories. In addition, post-prelim doctoral students spend twice as much time in these facilities as do masters and professional students.

TABLE 5
Students Using Laboratories and Other Specialized Agencies by Level of Study

VARIABLE AND COMPARISON	%	$\overline{X}$
Total Time in Laboratories:		
All Students	.269	
Masters and Professional Students	.246	491.2
Doctoral Pre-prelim Students	.293	638.9
Doctoral Post-prelim Students	.310	958.4
	*	**

* Means significant at alpha = .05
** Means significant at alpha = .01
% = Proportion of users
$\overline{X}$ = Amount of use – mean minutes/week

There are also marked differences in the use made of laboratories and other specialized agencies among disciplines of study (see Table 6) Approximately 4% of the law students indicate a use for this type of facility, while over 45% of the biological science students recorded some use. These data somewhat accurately reflect a student's progress through a doctoral degree program. For example, the doctoral students in the physical and biological sciences at the university studied were assigned a semiprivate laboratory. These laboratories also double as office and study areas. These students were also among the heaviest users of laboratories.

TABLE 6
Students Using Laboratories and Other Specialized Agencies by Discipline Study

DISCIPLINE DIVISION	%	$\overline{X}$
Agriculture and Natural Resources	.393	908.9
Architecture and Environmental Design	.292	316.8
Biological Sciences	.454	1209.2
Business and Management	.132	181.5
Communications	.312	297.1
Computer Sciences	.235	709.7
Education	.322	204.0
Engineering	.380	867.8
Fine and Applied Arts	.455	698.3
Foreign Languages	.156	216.0
Health Professions	.386	634.1
Home Economics	.382	941.5
Law	.039	52.5
Letters	.197	247.7
Library Sciences	.101	181.3
Mathematics	.125	68.2
Physical Sciences	.561	678.4
Psychology	.396	525.9
Public Affairs and Services	.079	388.9
Social Sciences	.110	245.4
All Students	.269	
	**	**

** Significant at alpha = .01
% = Proportion of users
$\overline{X}$ = Amount of use — mean minutes/week

SUMMARY

The significant results that stem from the data above are summarized as follows. 1) Masters and professional students and pre-prelim doctoral students tend to use more library and faculty resources than post-prelim students who tend to use more computer and professional staff and laboratory resources. 2) There are at least two broad categories of disciplines that utilize the same resources. The first group are the "hard" science oriented programs including biology, physics, physical sciences, and engineering sciences which tend to utilize resources like computers and laboratories. The second group is constituted of fine arts, humanities, and social science students who tend to use resources such as the library and some faculty and staff time. 3) A lower proportion of doctoral students who have passed their preliminary examination use university resources, with the exception of computers and laboratories, than master students and professional and pre-prelim doctoral students.

IMPLICATIONS

On the basis of the evidence presented here, it is clear that graduate students' use of resources depends both on their level and discipline of study. If these data are valid for a wide variety of institutions, several serious questions can be raised.

1. Unit costing procedures may be averaging out important disciplinary and level of study variations in costs.
2. Instructional units may be an inappropriate and erroneous basis for costing graduate programs.
3. The load imposed on a university by its advanced graduate students needs further study.
4. Cost simulation and projection models may be inaccurate for graduate education.
5. Allocations of indirect costs made on the singular base of instructional loads may be misleading and irrelevant if "real" costs are desired.

6. States that use formula funding for higher education on a level of study basis may be substantially *over-funding* at the advanced doctoral level, always presumed to be the most expensive, and *under-funding* at other levels of graduate study.
7. The assumption that there is an intensive relationship between faculty and students at the graduate level may be fallacious.
8. Internal services (e.g., computers, laboratories), if priced to recover *at least* operating costs, would probably not be competitive on the external market.

FUTURE DIRECTIONS

All of these questions reflect the limitations of our present understanding of the graduate educational process. Clearly, more research is needed to answer several important questions about where to go from here.

First, what utility does this kind of data have for cost analysis?

Second, what is a more appropriate base than instructional units on which to cost graduate education?

Third, could a "value added" concept be utilized in the costing of graduate education?

Fourth, can cost analysis focus on legitimate measures of output?

Fifth, would internal pricing of services work, thus allowing students to become real consumers in the educational market place?

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1. This author is particularly grateful for the continuous support and excellent guidance of Mr. Peter J. Czajkowski, Assistant Director of the University Office of Administrative Data Processing, University of Illinois at Urbana-Champaign.

2. John W. Alden, "The Utilization of University Resources by Graduate Students," unpublished doctoral dissertation, University of Illinois at Urbana-Champaign, 1971 (Loan copy available from author, 200 pp.).

3. *Ibid.*, ch. 3.

RESOURCE OPTIMIZATION IN A PRIVATE INSTITUTION – A CASE STUDY IN INSTITUTIONAL PLANNING

Paul F. Maeder, Everard Nicholson and Eric Brown
Brown University

This case study, which presents one attempt to develop a system to optimize utilization of limited resources, may be useful to other institutions faced with similar problems. The method derives from the assumptions that a private educational institution cannot be all things to all men and that to survive it must concentrate on specific segments of the educational spectrum, where it has the potential to offer first-rate educational programs.

For this presentation, it is assumed that an institution has decided what it can do well and has allocated its resources – faculty, facilities and dollars – to these areas. The objective, therefore, is to design a system which determines the best mix of entering students, subject to given constraints, which best fits the distribution of resources.

The first step is to ascertain whether or not it is possible to project from admission credentials the expected undergraduate resource requirements of various combinations of applicants. The rationale for development of such a projection system is based on two hypotheses: (1) institutional factors which influence students' course selections change gradually in a discernible pattern; (2) student characteristics, indicated prior to entrance, have a substantial and predictable influence over such course selections. If 1 is true, institutional press could be considered a constant over the short run, and the projections could be based upon student characteristics as they relate to course selection.

When the academic majors of the 1968-70 graduates were aggregated by area (humanities, social sciences, physical sciences, and life sciences) expected differences in resource requirements *between* the four areas were found, along with negligible inter-year shifts *within* the areas. Table 1 provides an illustrative sample. Having established that stability exists,

TABLE 1

Distributions Within Academic Areas of Percents* of Courses Taken by Departmental Concentrators

	COURSES TAKEN BY MAJORS IN											
	Humanities			Social Sciences			Physical Sciences			Life Sciences		
Area and Department	1968	1969	1970	1968	1969	1970	1968	1969	1970	1968	1969	1970
HUMANITIES												
Art	8	7	8	4	3	3	2	2	2	3	1	2
Classics	7	6	6	3	3	2	2	2	1	3	3	2
Linguistics, Co Literature, Mod Languages	15	15	15	8	8	9	7	7	7	8	7	7
English	26	27	27	13	13	13	8	7	6	10	10	10
Philosophy, Music, Religious Studies	11	13	12	7	8	8	5	5	5	5	6	7
SOCIAL SCIENCES												
Am Civ, Education, Egypt, Asian Hist	1	1	1	1	1	2	0	0	0	1	0	0
Economics	3	2	2	9	10	8	6	6	5	2	2	2
History	5	5	6	14	12	14	2	2	2	3	3	2
Political Science	4	4	4	16	16	15	2	3	2	3	3	3
Sociol, Anthro	4	4	5	7	8	9	2	2	2	7	7	8

(continued on following page)

	COURSES TAKEN BY MAJORS IN											
	Humanities			Social Sciences			Physical Sciences			Life Sciences		
Area and Department	**1968**	**1969**	**1970**	**1968**	**1969**	**1970**	**1968**	**1969**	**1970**	**1968**	**1969**	**1970**
PHYSICAL SCIENCES:												
Applied Math, Mathematics	4	4	3	5	6	5	21	22	21	7	8	8
Astronomy, Geology, Chemistry	2	3	2	3	2	3	9	10	9	7	8	7
Engineering	0	0	1	1	1	1	22	20	23	1	1	2
Physics	2	1	1	1	1	1	7	7	9	4	4	4
LIFE SCIENCES												
Biology	2	2	2	2	1	1	1	2	2	16	19	18
Psychology	4	5	6	5	5	5	2	2	2	20	16	18
Total Number of Courses Taken	6723	7096	6422	10453	10541	9043	4814	5415	5184	3058	3243	3772

*Rounded to nearest percent

it is then possible to examine the ultimate area of major study as it is related to the student pre-entrance characteristics of indicated academic interest and sex.

Matrices of probabilities of men and women who entered Brown University in 1963-1966 with stated academic interests versus actual majors at graduation were used to derive projections of group membership in each area for men and women who entered in 1967. The results reported in Table 2 indicate that of the 1090 graduates, only 34 were incorrectly projected out of area. Given the stability of the distribution of courses within concentration and the capability of projecting the numbers of potential concentrators, with a small degree of error, it appears that this type of approach would be of value to an institution which has selectivity within its applicant group.

In any mix of acceptable candidates for admission, some can afford the high costs of college and some cannot.

TABLE 2

Concentration Projections for Area of Concentration for All Members of the Graduating Class of 1971 Using "Least Square Method"*

Area of Concentration	Actual	Projected	Difference	% Error
Humanities	272	269.22	3	1.10
Social Sciences	329	336.68	-8	2.43
Physical Sciences	183	188.85	-6	3.27
Life Sciences	145	131.34	14	9.65
Non-Graduates	161	163.78	-3	1.86
Total	1090	1090.00	34	3.11

*Projection based on interest/concentration probabilities for men graduates and non-graduates and women graduates and non-graduates. Probabilities were derived for each sex using the classes graduating in 1967, 1968, 1969, and 1970.

An added dimension to decision making for all candidates prior to admission would be assessment of ability to pay varying tuition rates. This information is available only for those students who apply for financial aid, and is assembled late in the total admission process.

The approach used to gather estimated family earned income data for all students was that of attaching to an occupation an amount of money calibrated by level and years of service to create norms which fitted a population of parents of freshmen. An estimated family earned income scale was derived for executives, professionals, managers, clerical and other workers in a multidimensional model accounting for the employee, supervisory or self-employed nature of the work, and for executives the size of the firm. Each number in the scale indicates both occupation by level and income, and each has a standard deviation.

Individual codes of parental income are redistributed, 50% to face amounts and 25% each to plus and minus one SD. After conversion to money, parental sums are then distributed within the intervals adopted by the American Council on Education for students' estimates. The method provides ranges of incomes, even within the same occupations, as in real life, from presidents of large firms to unemployed.

Several validations have been conducted correlating scaled family income with real earned income reported by parents in the parents' confidential statement. Distributions of estimated income for freshman classes have been completed at Brown for the classes of 1974 and 1975, Tufts University for the class of 1975, and Southeastern Massachusetts University for the class of 1975. The correlation between scaled and real income for these institutions ranged between .68 – .77. There were nonsignificant differences between means in all cases. Table 3 contains the real and scaled distributions for the class of 1974 at Brown University.

It has been shown at Brown University that accurate projections of the total candidate pool can be made as early as October 15, at which time approximately 10% of the pool has applied. Thus it is possible to assess the financial effects of alternative admission policies very early in the

TABLE 3
Distributions of Percents of Family Earned Income, Brown University, 1971

ACE Intervals	Real Income: All who sought Financial Aid	Estimated Income from the Scale: All who sought Financial Aid	Estimated Income from the Scale: All Without Financial Need	Combined Income* for Total Class
Less than 4000	4.6	5.4	0.5	2.2
4000 – 5999	2.8	2.8	0.2	1.3
6000 – 7999	5.0	4.8	0.8	2.5
8000 – 9999	7.6	4.6	0.5	3.4
10000 – 12499	12.1	12.1	3.4	7.1
12500 – 14999	11.9	13.9	6.1	8.5
15000 – 19999	26.5	27.1	16.6	20.7
20000 – 24999	15.4	15.0	19.8	18.0
25000 – 29999	6.3	9.8	17.5	12.8
30000 – 34999	5.4	1.7	[illegible]	8.4
35000 – 39999	1.5	1.7	8.8	5.7
40000 or more	0.9	1.1	15.5	9.4
Count	461	461	640	1101
Mean	16726	16819	28006	23283
S.D.	7391	8032	12134	

*Distributions of real data for those with financial aid are combined with distributions of estimates of the remainder.

admission time table.

Monitoring the income distribution of the applicant pool also provides a greater understanding of the effects of changes in tuition. Further, the use of the scale to make an economic analysis of accepted students who do not matriculate provides greater insight into the economic factors involved in the selection of a college. Finally, the dual nature of the scale makes it possible to observe changes in parental occupation as well as income shifts in the applicant pool.

In addition to considering the financial and resource use implications which alternative mixes of students would have on an institution, there is also a need to assess the effects of increasing the enrollment of students with various academic interests without changing the quality of the instructional programs. The approach used was to set an upper limit on enrollments per full-time equivalent faculty member (FTE) in each department. Where increased enrollment would exceed this upper limit, new faculty would have to be added. In all other departments, no new faculty would be added. The effects on the support services of additional students were also calculated.

Table 4 shows the descending order of faculty loads, also faculty FTE's and departmental expenditures normalized with respect to total faculty and total expenditures. For example, Department 7 in the humanities had an average faculty load of 127.7 students, had 6.85% of Brown's faculty, spent 6.54% of the total appropriation to instructional departments and carried 12.31% of the total undergraduate enrollment.

Ratios of the probability that students entering either the physical sciences or humanities chose courses in that department to the probability that the average of all students chose that department, regardless of academic interest, were determined from the records of graduates of 1968-1970 and are also included in Table 4. These indicate enrollment changes which would occur if additional students with particular interests were added.

It is assumed that operating expenditures can be divided into four categories: (1) expenditures which are expected to increase proportional to undergraduate enrollment – deans' offices, student services, etc.; (2) expenditures which are expected to increase proportional to increases in faculty size – libraries, etc.; (3) expenditures in academic departments from general funds. These are assumed to increase together with the faculty of the department proportional to enrollment increases in the department if one department load is already at or above a certain limit; (4) expenditures which are not expected to increase due to increased undergraduate enrollment – president's office, development office, etc. Items of the 1971-1972 fiscal year budget and the incremental allocation factors are found in Table 5. The incremental costs per undergraduate enrollment are derived on the basis of the foregoing expenditure categories.

Using the data in Table 4, the effects $(\alpha_F + \alpha_E)$ of increasing the undergraduate enrollment can then be calculated for each department not only for the "average" student but also for the student with an interest in physical sciences or the humanities. These coefficients $(\alpha_F + \alpha_E)$ can then be used in conjunction with the incremental costs in Table 5 to

TABLE 4
Ratios of Enrollments and FTE by Department and Area, 1971-1972

Dept.	Area	UG/FTE	FTE/FTE$_T$	EXP/EXP$_T$	ENR/ENR$_T$	Phys. Sci.	Hum.
1	H	150.5	.0126	.0150	.0266	.745	1.494
2	SS	148.8	.0253	.0187	.0530	.773	.884
3	LS	146.5	.0340	.0359	.0701	.657	.823
4	SS	142.2	.0348	.0354	.0696	.773	.884
5	SS	140.5	.0209	.0145	.0414	.773	.884
6	H	134.3	.0252	.0235	.0476	.745	1.494
7	H	127.7	.0685	.0654	.1231	.745	1.494
8	O	122.3	.0034	.0041	.0059	–	1.494
9	O	121.0	.0021	.0021	.0035	–	1.494
10	H	114.1	.0252	.0228	.0404	.745	1.494
11	SS	112.0	.0346	.0273	.0546	.773	.884
12	SS	110.5	.0266	.0306	.0414	.773	.884
13	SS	97.7	.0034	.0025	.0050	.773	.884
14	PS	81.7	.0540	.0436	.0621	1.399	.536
15	H	80.2	.0172	.0151	.0194	.745	1.494
16	H	77.8	.0251	.0191	.0274	.745	1.494
17	PS	69.8	.0354	.0608	.0348	2.116	.536
18	O	60.1	.0062	.0059	.0052	–	.884
19	H	47.2	.0252	.0201	.0167	.745	1.494
20	PS	45.5	.0247	.0274	.0158	2.116	.536
21	PS	44.3	.0889	.1030	.0554	2.116	.536
22	H	38.8	.0397	.0276	.0216	.745	1.494
23	H	38.3	.0220	.0143	.0113	.745	1.494
24	PS	33.7	.0625	.0537	.0296	2.116	.536
25	LS	32.4	.1363	.1415	.0621	.657	.823
26	PS	32.3	.0711	.0961	.0322	2.116	.536
27	H	27.8	.0199	.0173	.0078	.745	1.494
28	H	26.9	.0201	.0157	.0076	.745	1.494
29	SS	24.4	.0081	.0087	.0028	.773	.884
30	H	24.2	.0106	.0116	.0036	.745	1.494
31	SS	5.5	.0042	.0039	.0003	.773	.884
32	SS	2.0	.0042	.0065	.0001	.773	.884
33	O	–	.0063	.0052	.0000	–	–
Total		71.1	1.0000	1.0000	1.0000		

calculate net tuition income.

Results from this analysis are found in Figure 1. Once the course enrollment per faculty ratio is determined beyond which compensatory faculty increases and increases in departmental expenditures are expected if enrollments are to be increased, the net incremental income per additional student admitted can be read off on the left-hand scale if the student is not to receive financial aid, and on the right-hand scale if the student is to receive on the average the same financial aid as the present student body.

It is seen that if the faculty load cut-off ratio of 100 is chosen, an additional student admitted without regard to his particular interest will produce additional net income of $1130 if he does not require financial aid. Similarly, a student with an interest in the physical sciences will produce a net income of $1460, and a student with an interest in the humanities, a net income of $975. If such a student is to receive average financial aid, the figures are $390, $720, and $235 respectively.

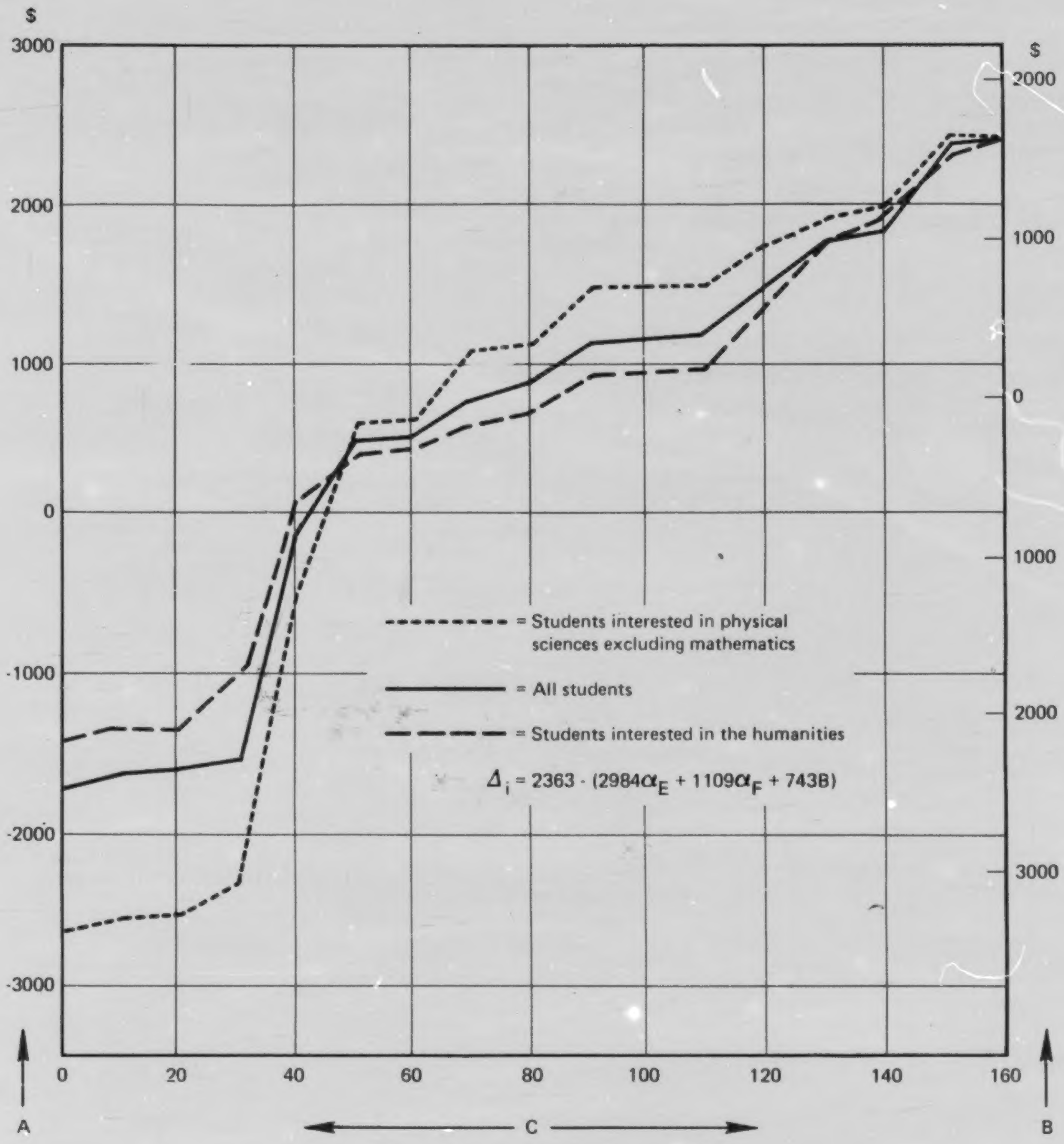
Finally, it should be pointed out that it is in the nature of such studies as the present one that, while they go into considerable detail department by department and cost item by cost item in their analysis, they should enter the decision-making process only in an overall and general fashion to determine objectives. Detailed decisions should be made only after much more scrutiny and analysis which takes into account many other factors. If one then should decide to proceed with a program to increase the enrollment,

TABLE 5
Line-Item Budget, 1971-1972

	Amount 71-72	Incremental Alloc. Factor	Amount Per U.E. 71-72*	Incrm. Amt. Per U.G. Enr.
ADM. & GENERAL:				
General Adm.	1,743,791	.191		
Student Service	1,257,884	1.0		
Dev., Alumni, P.R.	1,391,523	0.0		
General Inst.	836,022	0.0		
Total Adm. & General	5,229,220	.304	148.50	45.14
INSTRUCTION:				
Instr. Depts. and Univ. Res.	12,889,996	α_E		
Grant & Contract Res.	7,562,500	0.0		
Univ. Ext.	40,000	0.0		
Libraries & Museums	2,237,397	α_F		
Total Inst.	22,729,893	$.567\alpha_E + .098\alpha_F$	645.00	$\alpha_E 365.72 + \alpha_F 63.21$
INTERCOLL. ATHLETICS	741,367	0.0	21.06	
EDUC. PLANT OPERATIONS:				
Instr. & Adm. Buildings	2,139,630	α_F		
Libraries & Museums	423,990	α_F		
Athletic & Recr. Fac.	319,030	1.0		
General Grounds	136,025	0.0		
Security	375,000	.5		
Heating Plant and Office Bldg.	450,000	0.0		
Total Educ. Plant	3,843,675	$.666\alpha_F + .131$	109.20	$\alpha_F 72.73 + 14.30$
TOTAL EDUC. & GENERAL	32,544,155		924.00	$\alpha_E 365.72 + \alpha_F 135.94 + 59.44$
STUDENT AID FROM GENERAL FUNDS	3,209,000	$0<B<1$	91.10	B(91.10)
TUITION INCOME	12,286,350	1.0	349.00	349.00
NET INCOME				$289.56 - (365.72\alpha_E + 135.94\alpha_F + 91.10B)$

*Projected undergraduate enrollments for 1971-72 = 35,195 for 4311 students.

one should use the detailed information of this study as a rough guide only, and carefully analyze these and other departments to determine whether a faculty increase is indeed justified or not justified respectively in a particular department. Also, as a perturbation analysis, the results would be applicable only in the case of small increments – 5% to 10%.



A = Incremental income (or expenditure) per student with no financial aid (Δ_i).
B = Incremental income (or expenditure) per student with average financial aid.
C = Undergraduate course enrollments per FTE faculty (UE/FTE).

Figure 1: Results from Incremental Analysis

IMPLEMENTING A DISTRIBUTIVE COST MATRIX AT THE UNIVERSITY OF DENVER

Ralph A. Forsythe
University of Denver

Elmo V. Roesler
Appalachian State University

Jerome F. Wartgow
Governors State University

The financial support of higher education in the United States has become one of the great political issues of the day. Boards of trustees, state legislatures, and the Congress find themselves increasingly involved in meeting difficult questions concerning the funding of higher education. Unfortunately, the contributions by members of the university community toward solving these problems have often been made on an intuitive basis, without strong administrative rationale.

Many university administrators traditionally have recognized only the receipt of additional funds as the solution to their financial problems. Recently, however, the public and many members of the academic community have demanded more efficient allocation of currently available resources to meet financial crises. As a result, pressure has been increasingly brought to bear on administrators of higher education to evaluate their programs in terms of *costs* as compared to results achieved. Business and industry have developed several methods of management designed to evaluate programs in exactly these terms. Many of these techniques are now becoming available to educators and are often recommended as the means of delineating and resolving the financial problems of higher education.

This paper is concerned with the use of one such technique, the program-planning-budgeting system, and its possible application at the University of Denver.

As a result of a study conducted during the spring of 1971, personnel in the Office of Institutional Research wrote a "Proposal for Implementing a Distributive Cost Matrix at the University of Denver." This paper, incorporating the ideas presented in the proposal, has as its goal the stimulation of interest in the use of a program-planning-budgeting system (PPBS) by college and university administrators. Included in the proposal are: (1) broad guidelines concerning the development and implementation of a distributive cost matrix (DCM); (2) suggested modifications in the Western Interstate Commission for Higher Education (WICHE) program classification structure and Center for Advanced Study of Educational Administration (CASEA) model to meet the unique cost analysis needs of the University of Denver; and (3) an explanation concerning how the distributive cost matrix may be used to produce a crosswalk between the university accounting structure and the program classification structure.

THE IMPORTANCE OF IMPLEMENTING A DISTRIBUTIVE COST MATRIX

There is little disagreement concerning the fact that higher education is in a financial crisis. Private institutions are often the first to feel the pressure, and as sources of funds continue to dwindle, pressure for cost effectiveness increases. The challenge for more efficient use of the university resources is evident in several of the recent major reports concerning problems in higher education.[1]

The Report of the President's Task Force on Higher Education made recommendations concerning the allocation of resources. Included as one of the three top institutional priorities was "More Efficient Use of Resources." The consensus of the task force is summarized in the following paragraph.

> Resources available for higher education are and will remain limited and are likely to be insufficient to meet the expanding expectations and increasing demands of the near and longer term. Here, it is incumbent on those in higher education to make more effective and efficient use of the resources available to them.[2]

The task force went one step further when it suggested methods that might be used to meet the above challenge.

> It is a matter of highest priority that colleges and universities should make major efforts to improve management, planning, cost effectiveness, and fiscal controls, and to reach a constructive reconciliation of the needs for more effective management techniques and the desire for wider participation in decision-making.[3]

The *Report on Higher Education*, chaired by Frank Newman, has devoted an entire chapter to a discussion entitled, "The Illegitimacy of Cost Effectiveness." The Newman Report stated that "thinking about costs . . . is a fundamental educational issue."[4] The importance of efficiency is highlighted throughout the report as the following example illustrates.

> For the university as well as for society, the issue is effective use of resources. If time and energy can be saved by adopting more cost-effective procedures, those energies can be devoted to a long list of tasks now starved for resources . . . Considering what needs to be done, we can afford the high cost of education, but not the low productivity.[5]

As a final challenge to the academic community, Newman included the following remarks on the concluding pages of the report.

> . . .the illegitimacy of cost effectiveness. We have found that institutions under financial pressures often

respond only by cutting expenditures in the easiest ways, rather than making choices according to the relative merits of academic programs or the most cost-effective approaches to teaching. It is apparent that with multimillion-dollar budgets and a growing questioning by the public, higher education can no longer afford the luxury of avoiding consideration of how effectively it uses its resources.[6]

The reports cited above have clearly stated the challenge: there must be more efficient allocation of resources in higher education. The problem lies in the methods of accomplishing this objective. The most common answer is that those techniques of cost effectiveness which have been successful in business and industrial applications should be applied to higher education. However, as indicated by Newman, cost effectiveness methods have often been applied in ways which detract from their true purpose.

The implementation of a program-planning-budgeting system in a college or university would be one attempt to meet the challenges issued above. This paper is intended to stimulate interest in the implementation of a distributive cost matrix as part of such a system.

ADAPTION OF A PPB SYSTEM TO THE UNIVERSITY OF DENVER

There are a number of factors to be considered in installing PPBS, including the identification of (1) essential PPBS characteristics, (2) personnel and equipment resources, (3) time requirements, and (4) steps in the development of the distributive cost matrix as a part of the system.[7]

Essential PPBS Characteristics

Though it may be assumed that the readers of this paper are cognizant of PPBS history, of the distinctions between a PPB system and a conventional budgetary system, and of the advantages and limitations of PPBS, the characteristics essential to the system should be noted. Hartley has said that PPBS has at least six major distinctive characteristics: (1) analytic modes which are used to generate new objectives and alternatives and to help specify the most appropriate courses of action; (2) planning which is the production of the range of meaningful potentials for selection of courses of action through a systematic consideration of alternatives; (3) programming where the planned goals are related to specified alternative programs; (4) budgeting features which relate programs to resources and express this relationship in terms of budget dollars; (5) structural features which permit programs to be analyzed on several levels; and (6) administrative features which are designed to facilitate the kind of information and data analysis that provides administrators with a complete basis for rational choice.[8]

It should be observed that two assumptions undergird the discussions, by Hartley and others,[9] concerning PPBS characteristics. The first assumption is that the programming-planning-budgeting functions have to be *systematically* interrelated. And the second assumption relates to data flow and control, i.e., the accounting and program structures have to be classified and/or coded so that they accommodate the PPB system. These assumptions were noted and influenced the staff in the decision to adopt the CASEA model and the WICHE program classification structure.

Personnel and Equipment Resources

The staff should assess whether or not the university encompasses the components necessary for a complete PPB system. Specifically, it would be necessary for the university to continue development of an extensive management information system which can regularly provide decision-makers with the kinds of data needed for output-oriented planning. This data bank should contain information about both actual and desired states of the system, its inputs, processes, and outputs.

Prior to the collection of the types of data mentioned above, certain decisions should be made. First, a decision should be made regarding where to begin the process of data files. Logically, these files might best be developed within the office of institutional research, and in cooperation with a computer center or a systems development staff. A second decision would be required concerning the extent to which the data bank must be developed before implementation could begin. This decision would be a function of the desired level of implementation at the outset, and the decision we made is discussed in the section which follows.

At the University of Denver the necessary equipment resources were already installed and operational, and the implementation of PPBS would require no additional outlay for equipment.

Time Requirements

It has been shown that administrators play a crucial role in introducing innovation in education, particularly if instructional change is involved. Because institutions are hierarchical, administrators often have more power, and thus they can handle the problems associated with the introduction of innovations more effectively than others.[10] With strong administrative support, three to five years has been estimated as the time necessary for *complete* installation of a system.[11] However, this time period can be shortened considerably if only a portion of the institution is converting to the system.

At the University of Denver the decision was made to approach implementation through operation of the PPB system on a parallel basis with the current budgetary system.[12] This would permit an opportunity to refine technical details, compare results of the two systems and implement PPBS in phases and at different rates within the various programs.

Steps in the Development of the Distributive Cost Matrix (DCM)

The objective in preparing a DCM for the University of Denver, as part of the development of a PPB system, was to create a university data bank of designative information regarding the on-going processes of the university and the actual inputs to those processes.

The construction of the DCM included the following steps – or broad guidelines for the development and implementation of the matrix.

1. Identification and categorization of *all* primary (instructional) and support (non-instructional) activities in the university. This task included the incorporation, within the matrix, of the "Program Classification Structure" as developed by the Western Interstate Commission for Higher Education. The classification structure was modified to meet special PPBS needs.
2. Identification and categorization of all major costs which can be associated with those identified activities.
3. Disaggregation of both the major activity and cost categories to a level of specificity which will be most useful to university personnel in planning. The initial disaggregation at the University of Denver was to the department level. However, the system contains the flexibility to disaggregate to the course and section level.
4. Preparation of a two-dimensional matrix of these program activities and cost categories for the total university. A modification of phases one and two of the Center for the Advanced Study of Educational Administration (CASEA) data-based educational planning system (DEPS) was used in developing the matrix. The CASEA model helped the staff to identify component activities in a PPB system and to demonstrate how costs, which are related to program activities, could be collapsed and/or aggregated.
5. Development of a coding system and a functional accounting system which can monitor and report both cost data in terms of identified activities and data for purposes of allocating costs between and among particular activities.
6. Operation of the system on a parallel basis with the conventional budgetary process for a specified period of time. Such operation permits drawing of comparisons between the two processes and provides an opportunity to work out discrepancies.
7. Mathematical manipulation of the data presented in the DCM. This stage helps to familiarize university personnel with matrix structures and allows them to engage in input-oriented planning.

DESCRIPTION OF THE DISTRIBUTIVE COST MATRIX

Figure 1 presents a sample distributive cost matrix for the University of Denver. This matrix, although not represented in the detail which may be desired, does identify and categorize the major primary and support programs of the university. Printing and duplication facilities prohibit inclusion of all programs in the figure, hence the term "sample" distributive cost matrix.

The DCM has been developed for two purposes. First, it gives a schematic representation of the cost allocation concept. It is hoped that this will facilitate understand-

2 – SUPPORT PROGRAMS								
0 – Year 1 – Fall 2 – Winter 3 – Spring 4 – Summer								
4 Academic Support					5 Student Services			
1 – Libraries	2 – Museums & Galleries	3 – A-V Services	4 Computing Support	5 Auxiliary Support	1 Social and Cultural Development			
					10 Student Development	20 Intercollegiate Athletics		30 Other
						10 Hockey	20 Basketball	
						100 0 Varsity		
						000 Other		
						0		

Figure 1: Sample Distributive Crosswalk

ing of the purpose of developing such a matrix. Secondly, it demonstrates the interrelationship between data and provides an example of how these data may be mathematically manipulated.

The DCM may serve to clarify the manner in which typical budgetary classifications will relate to the Program Classification Structure. For the purposes of this illustration, the DCM only represents a small segment of the entire matrix. In practice, data from the institution's entire budget will be combined with the entire spectrum of program elements. Thus an institution's "crosswalk" will be far more extensive than the sample used for this illustration.

The hypothetical illustration used here may be interpreted as follows:

Example 1:

Budgetary	Classification
2	Expenditure
1	Educational and General
3	Instruction
12013	Faculty Salary
213 12013	

Program Classification	
1	Primary Program
3	Spring Quarter
1	Instruction
1	Regular Instruction
10	Arts & Sciences
16	History
3640	History of Colorado
101	Section Number
1 31 1 10 16 3640 101	

Example 2:

The 0 would indicate that an expenditure classification would relate to a program classification in the following manner.

Budgetary	Classification
2	Expenditure
2	Auxiliary Enterprises
1	Intercollegiate Athletics
12285	Travel
2 2 1 12285	

Program Classification	
2	Support Programs
2	Winter Quarter
5	Student Services
1	Social & Cultural Development
20	Intercollegiate Athletics
30	Ice Hockey
1000	Varsity Team
000	Further Description
2 25 1 20 30 1000 000	

The hypothetical accounting system used for this illustration is based on a twenty-three digit account number to identify each account. The first eight digits relate to budgetary classifications and the next fifteen digits to program classifications.

In the above examples, the computer print-out may be expected to read as follows:

Example 1: 21312013131101636 40101

Expenditure from educational and general for instructional faculty salary to course 364.0, Sec. 101, in the History Department, within the College of Arts & Sciences.

					1 – PRIMARY PROGRAMS												
				(Time-Quarter)	0 - Year 1 – Fall 2 – Winter 3 - Spring 4 – Summer												
				(Program)	1 – Instruction												
				(Sub-Program)	1 – Regular Instruction												
				(Program Category – College)	10 – Arts & Sciences												
				(Program Sector – Department)	01	03	06	08	09	11	12	13	14	16			18
				(Program Element – Course)										364.0		372.0	
				(Program Sub-Element – Section)										001	101		
2 EXPENDITURES	1 EDUCATION & GENERAL	1. General Administration	12000 –	12099 Salaries & Wages													
		2. General Expense	-000	Administration & General													
		3. Instruction	-001	College Work Study													
		4. Organized Activity/Ed. Depts.		Program													
		5. Organized Research	-004	Overtime Premium													
		6. Libraries A-V Aids	-008	Proposal Preparation													
		7. Operation & Maintenance of Physical Plant	-009	Sponsored Contracts													
			-013	Faculty											X		
		8. Related Prov. Accts.	-016	GRA													
	2 AUXILIARY ENTERPRISES	1. Intercollegiate Athletics	-017	GTA													
		2. Bookstores	-023	Secretary													
		3. Apts. – Dormitories	-099	Outside Services													
		4. McFarlane–Johnson Halls	12100 –	12299 Other Expenses													
		5. Centennial Halls	-138	Computer Expense													
		6. Married Student Housing	-152	Entertainment													
		7. Centennial Towers	-206	Meetings, Professional													
		8. Personnel Housing Expense	-253	Fringe Benefits													
		9. Other Rental Properties	-263	Supplies & Expenses													
		Continued ↓	-285	Travel Admn. & Gen.													
			-290	Tuition													

// Denotes omission

SPONSORED PROGRAMS CONTRIBUTION TO THE FINANCIAL CRISIS IN HIGHER EDUCATION

N. E. Taylor
University of Montana

Last winter in a talk before a group of state legislators and businessmen, I started my remarks by saying:

> As everyone knows, when a grant is awarded (to the University of Montana), it is given to a particular professor; the overhead money is *comparable to a profit* (and parenthetically, should be made available immediately to finance a football stadium or returned to taxpayers as an offset to property taxes); and the salary payments to individual researchers from grant monies are paid as extra compensation.
>
> Nearly everyone "knows" these statements are true. Of course, *all of them are false.* It is unfortunately the case (for those who are persuaded otherwise) that neither the tenacity of one's beliefs nor the frequency of their assertion can alter the facts. As a famous American humorist and philosopher once said: "The problem with most people is not ignorance, rather that so much of what they know just isn't so."

The prevalence of the opinions cited can be illustrated again from the lead paragraph of a news story published last August in *The Missoulian.* "The day after the announcement I started getting calls from real estate brokers, car salesmen and boat dealers. At first I couldn't figure it out," said a University of Montana professor.

The announcement was a press release indicating that he had received a grant of $100,000 from a federal agency to do research.

"Then it dawned on me," he continued. "People actually thought that money was mind to spend."[1]

To keep the record straight (in Montana), all research and training grants or contracts with any sponsor are made *by* the institution, not the individual who may have written the proposal. Second, faculty opinion to the contrary, overhead is not a simple markup over total costs. Sponsors, and especially the federal agencies, may be flawed in different respects but they are not careless. The indirect cost rate is agreed to by the federal auditors and in fact set by them in most instances. Third, salary payments to investigators provided by grants are paid in lieu of state compensation, unless the individual is not under contract.

WHAT IS THE PROBLEM?

On many if not most campuses sponsored program activity is partly responsible for the financial crunch in higher education – not a solution to it.

Let me illustrate some ways in which institutions, either directly or indirectly, find their scarce resources committed (or worse, unintentionally diverted) to sponsored programs in actual support expenses.

1. Certain sponsors require cost sharing (e.g., National Science Foundation, Department of Health, Education, and Welfare).
2. Many programs, especially training grants, require matching cost (contributed time or hard dollars) participation by the grantee (ranging from token to dominant support).
3. Some projects require maintenance of effort (i.e., no reduction of the institution's rate of support as long as the program is funded), no matter what legislatures or development officers may have done to your budget.
4. Some grants involve a commitment to continue programs well into the future, after the sponsor withdraws his support.
5. Indirect cost reimbursement rates are lower than actual expenditures; with a *perfect* management information and accounting system one could obtain full reimbursement for general institutional expenses. Since most institutions do not enjoy this status, to some degree then our imperfections amount to a subsidy of the federal government or other sponsor.
6. Typically, budget support for higher education responds slowly, if at all, to the demands of externally-funded projects. Yet, new or expanded programs require teaching and research space and they attract students with an associated need for dormitory and dining room service, and so forth. The casual relationship is seldom made explicit.
7. If sponsored program participation is simply added to the duties of the faculty they may be exploited to the detriment of the instructional program. But, if new staff are authorized they must be provided office and laboratory space, general supplies and equipment support, secretarial service, and so on, beyond what is funded by the grant.
8. Many predictable grant support expenses are *not* authorized by the sponsor's guidelines. These may include equipment, travel, library acquisitions, publications, renovation, construction, equipment installation and operating costs. When they are essential to the project, they must be charged to departmental budgets or to the physical plant or some other account.
9. Pre- and post-grant expenditures are frequently crucial to a project, yet they do not occur during the period of the grant and are not allowable as charges against it. Examples of these are recruiting, travel, consulting and proposal writing expenses; similarly, the costs of surveys, duplication, and evaluation after the project has been terminated are other examples.

SOME HAZARDS OF GRANTSMANSHIP

Embarrassing and costly situations that may develop can be illustrated by the following.

1. One institution, as a consequence of its eagerness to gain visibility by identifying with a prestigious research activity, acquired (as a by-product when sponsor support ceased) three tenured faculty members. The multi-year project required the employment of three associate professors. They were overlooked when the time for AAUP tenure notice expired. On termination of the grant, the college had three costly professors on its payroll with no approved degree or curriculum to absorb their teaching skills.
2. Another college was happy to receive a grant for the acquisition of a very sophisticated piece of laboratory equipment. After installation it was discovered that a $12,000-a-year technician was needed for its operation.
3. Administrators are quick to discover that faculty members, however brilliant in their own disciplines, cannot always be relied upon for counsel in other matters. The kind of professor I am referring to is perhaps not unlike the individual described in this quotation (from a student evaluation in the Boston University 1971 Course Evaluation Book):

   > The lectures were complicated by the fact that Professor X had trouble communicating. To his credit, however, an overwhelming majority of the respondents (41% of the class) felt that Professor X was adequately prepared and did allow time for questions. Despite his preparation, his lectures were considered from horrible to fair. Fortunately, however, he never had much of an audience to bore. As a matter of fact, the only time there was any type of showing was during the exams. Professor X was hired too late and too mediocre. Some men are born mediocre, some men achieve mediocity, and some men have mediocrity thrust upon them. With Professor X it has been all three. Even among men lacking all distinction he inevitably stands out as a man lacking more distinction than all the rest, and people who meet him are always impressed by how unimpressive he is.[2]

   I suppose every campus has a Professor X or two. He is the one who, in negotiation with sponsors and having to pare expenditures to meet the funds available, blithely (and improperly) agrees to strike indirect costs from the budget as not being a real expense. He is also the one who proudly announces to the administration and the press how he has mesmerized a donor and is to receive for his department a computerized widget. The following week he sends the president a budget request for $50,000. He needs hard-wiring to the computer, a 440-volt line, a re-engineered floor to carry the weight, air conditioning, and lead shields for radiation protection. This is the first mention of these considerations.
4. On the other hand, there are also certain hazards in relationships with grantor personnel. The federal grant administrator can be too cooperative; he wants you to succeed and he wants to be helpful. But, he cannot speak for the auditors who are "going by the book." The institution itself must be responsible for understanding and administering the guidelines of the agency. Your friendly contact in Washington may be quite willing to approve the exception that you request. If he does, be certain it is in writing and in advance. When the expenditure is questioned under audit and disallowed two years later, you discover that your friend is now a consultant to the Peace Corps in Chile. No one else remembers the conversation.

PLAYING THE GAME, OR 2 + 2 = 3

It is commonly accepted that there are two basic categories of costs incurred when sponsored programs are initiated – direct and indirect costs. Direct costs normally would include: salaries, fringe benefits, consumable supplies, equipment and facilities, renovation and construction, travel, publication, and similar items.

Indirect costs (i.e., those not readily identifiable with a particular research or training program) might include: general university expenses, central and departmental administrative expenses, research administration, library, and the physical plant operating and maintenance expenses. Indirect cost rates on a given campus vary according to the function (research vs. training), the location (on or off campus) and by virtue of special negotiated agreements.

However, there are at least two other cost categories that institutions have chosen to ignore that can be just as important as the ones cited. The first is opportunity costs, i.e., the lost values of those functions that are less well supported or foregone because university resources are pledged to support sponsored programs. They are overlooked because they are arbitrary and abstract.

The second additional category is the real costs that are incurred in addition to direct and indirect costs that are seldom calculated by research administrators. These are the costs of faculty time (and the frustration) in writing proposals that do not get funded and the price paid for the diversion and fragmentation of collegial goals. These are evidenced by student disenchantment with poorly prepared and delivered lectures and the unavailability of faculty for counseling and by faculty unrest when grantsmen are given merit for shallow, pedestrian, sponsored program participation. Regents and legislators and taxpayers are unhappy when they perceive muddled or contradictory aspirations and activities inconsistent with the university's own proclaimed goals and talents.

Higher education reaps a harvest of discontent when it fails to define its mission and to be discriminating, instead opting for any project that will pump new dollars into administrative coffers (the fund-raiser syndrome).

It is a sad truth that when you enter into a partnership with the federal government, you inevitably discover that it has 51 percent of the voting rights. Administrative effort is frittered away in the supervision of projects, from department chairmen all the way to the president of the institution. Faculty resources are dissipated in reconciling time and effort reports to federal requirements. Staff time is endlessly preoccupied with exit interviews, responses to disallowances and exceptions, reviewing costs with auditors, and locating equipment and acquiring title to it.

Supervisory talents are spread thin in maintaining records to justify indirect costs, in providing transactions evidence for the audit trail, and in preparing and explaining policy manuals in endless meetings and missionary efforts for the enlightenment of the faculty. There are real costs for inefficiency, crowding, complexity and controlling "the great program director," who answers only to God. And these are *internal* matters which are fairly straightforward to cope with.

In addition there are numerous exogenous variables which are seldom predictable and to which one can only react. Such factors include the imposition of a ceiling on expenditures by a sponsor, changes in the annual rate of support for a program, seemingly capricious cancellation of traditional activities and the addition of new programs. These costs are reflected in personnel turnover, hundreds of dollars spent for newsletters and reference materials to keep up with changes, graduate student drop-outs for lack of support, and dislocations caused by frequent space reassignment and equipment relocation.

WHY PLAY THE GAME?

The answer is easy and direct. The benefits are greater than the costs. The academic professional in many disciplines is trained and motivated and may even be required to do research. More and better research is possible from sponsor support.

The dedicated teacher is anxious to improve his techniques, to innovate, and to share his experience and knowledge with a wider audience. More and better teaching is possible from sponsor support.

The pressures to take higher education to the community are understood and accepted by faculties. Many are eager to participate in decision-making and problem-solving processes. More and better public service is possible from sponsor support.

Externally financed research is a major source of support for graduate programs. It provides for graduate student employment. Research is part of the learning process for students and faculty alike. It can give breadth and depth and discipline to the mind.

For many universities any respectable research effort must be financed from non-appropriated sources. Often one cannot attract a desired faculty member without a positive research environment.

Sponsored programs do purchase equipment and supplies which are available for instructional uses when contracts are completed. They can provide summer employment for faculty which often is not guaranteed, with no drain on state or local dollars. They often pay for travel to national meetings which otherwise would not be attended or would require institutional funds. They can purchase library resources and cover the high page costs of prestige publications.

In summary then, participation in sponsored programs is justified when the activities undertaken are consistent with the institution's goals and functions, when the opportunity costs are considered and deemed acceptable, and when the magnitude of other real costs is both anticipated and reasonable.

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1. Sharon Barrett, "Research Grants Go into Research, Not the Researcher's Pocket," *The Missoulian,* August 23, 1971.
2. "Boston University 1971 Course Evaluation Book," *College and University Bulletin,* American Association of Higher Education, December 1, 1971.

HOW TO COST A UNIVERSITY PROGRAM

Dr. John Wm. Ridge
Charles R. Bauer
Dr. Larry G. Schnack
University of Wisconsin-Eau Claire

INTRODUCTION

Regardless of the popularity of PPBS during the last decade, university fiscal accounting for the most part remains geared to the administrative structure of the institution rather than reflecting university programs. However, the expression of need for costing those programs grows in intensity and in the number of sources. In response, regional and national attention (notably by WICHE-NCHEMS) is being given to university program cost analysis.

The accumulating results of regional and national studies provide valuable guidance to the local institution, yet that guidance is not yet conceptually or operationally sufficient for local needs.

This paper reports the creation of a manual developed to meet the specific needs of the University of Wisconsin-Eau Claire but with sufficient conceptual input from other institutions and with sufficient guidance from regional and national projects that it may prove to have wide applicability.

As the manual is being developed, a complete cost analysis on Fall 1971-72 data is being undertaken. This effort serves to keep the developmental efforts realistic and operational. The resulting procedure is to be evaluated against the following criteria. 1) The procedure must be practical. The supporting manual must be in itself a sufficient guide to conduct the analysis. 2) Existing institutional fiscal accounts necessarily must be accepted as input. Modifications of the university account structure to meet the requirements of the analysis may be a parallel but not prerequisite development. 3) The analysis must be replicable within fairly narrow limits. The assignment of costs to program elements and the combination of program element costs to obtain program costs must be sufficiently operationally specified to allow repeatability. 4) The analysis is based on a sequence of accounting type decisions. These decisions must be carefully isolated and fully documented to allow other users to evaluate each decision and to make other choices if deemed desirable or if dissimilar programs are to be costed. 5) The procedure of costing a program from the university account structure must be reversible. In other words, if a decision to alter program costs is made, the procedure must allow the investigator to determine which university account (and which line item) must be modified to modify the program cost. 6) The procedure must lend itself to the simulation of alternative proposals to evaluate the costs of each proposal or to establish marginal (incremental) costs. 7) The procedure must be capable of being integrated into the budgeting-control-review system of the institution.

This paper is submitted for the purpose of seeking a critical review of the principles and procedures used in the cost analysis procedure. Additionally some of the suggested solutions to practical and conceptual problems may be of interest to others attempting such analyses.

OVERVIEW

Included in the cost analysis procedure are the steps necessary to allocate budget line items to program elements as well as steps which combine program element costs with program costs. Figure 1 displays a procedural paradigm for the conduct of comprehensive analysis of costs as developed in the *Manual*. Section I, "Principles," of the *Manual* documents the major decisions and agreements which lead to those procedures. The procedures are summarized in the *Manual* as Section II, "Procedures;" the latter is a "cookbook" to guide us in conducting each study. This paper summarizes each step of the procedure and several major decisions used in generating the principle.

THE COST ANALYSIS

A few of the major principles of the cost analysis procedure developed in the *Manual* now will be commented upon.[1]

Step I *Display Resources by Source*
A. Current Operating
B. Physical Facilities

All public economic costs which are direct costs to the institution must be included. Social non-economic costs, private costs (food and clothing, etc. while a student), and inputed and indirect costs (such as the prorata share of government bureaus) are excluded. The analysis period is always the *term*, and longer period costs (e.g., a fiscal year) are determined by summation. All funding sources must be included to allow a knowledgeable comparison between terms of among institutions. Either budgeted or experienced costs may be used depending on intent and feasibility.

Step II *Display Institutional Accounts*
Display of costs as reflected in local accounting scheme by object of expenditure.

Money is managed within each institution by assigning specific amounts to specific offices, departments or "project headquarters." Each formally assigned amount is recorded in a unique account and is controlled through a separate account statement. These accounts are accepted *a priori* and changes in the data need be made only in the study data, not the account structure (although a particular institution may wish to use a more meaningful structure after conducting a cost analysis). Each account must be listed with a note as to its funding source, name, type of account (T1 = regular account; T2 = clearing accounts, accounts created for ease of internal processing and which contain only funds also recorded in

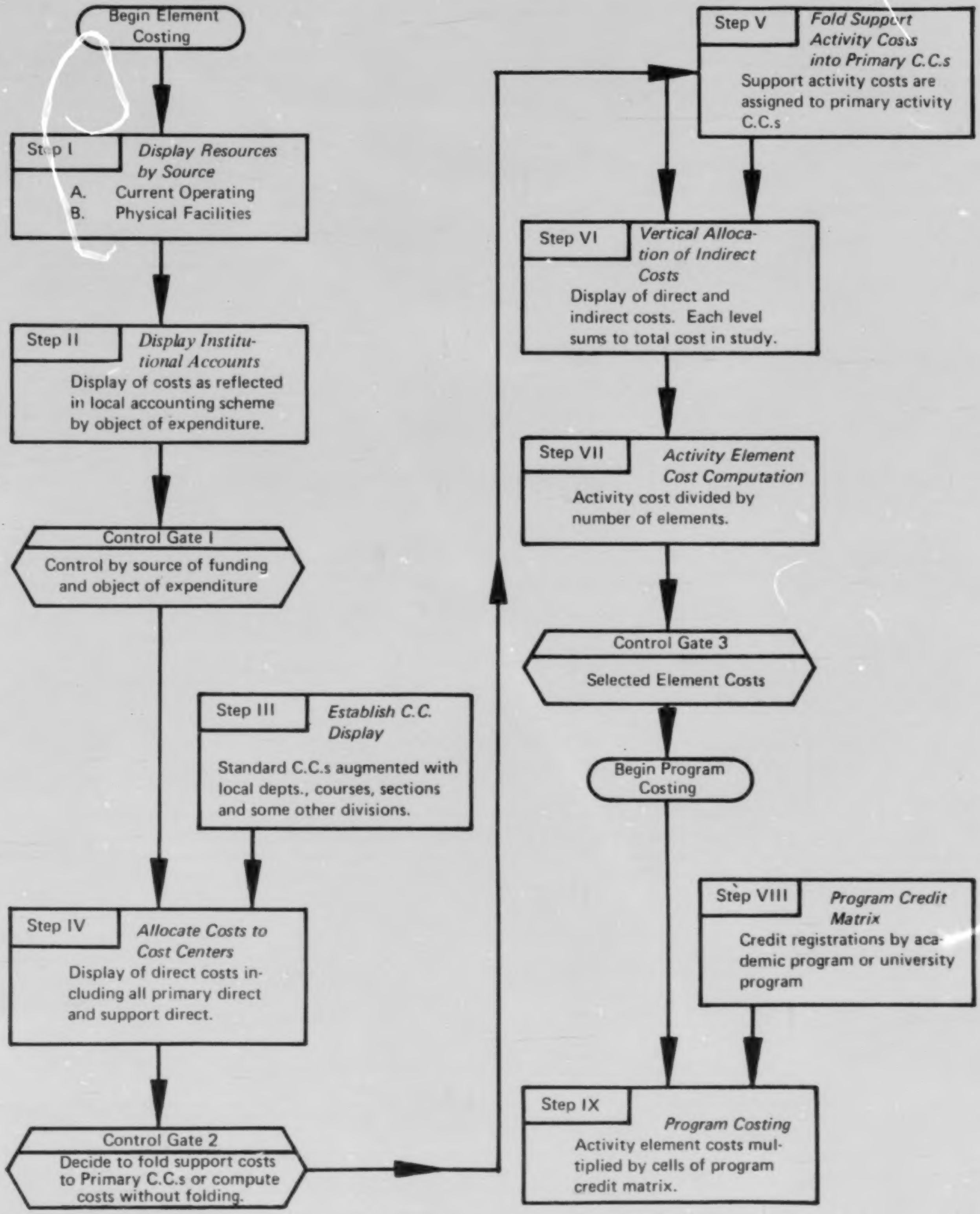
Begin Element Costing
Step I
Display Resources by Source
A. Current Operating
B. Physical Facilities
Step II
Display Institutional Accounts
Display of costs as reflected in local accounting scheme by object of expenditure.
Control Gate I
Control by source of funding and object of expenditure
Step III
Establish C.C. Display
Standard C.C.s augmented with local depts., courses, sections and some other divisions.
Step IV
Allocate Costs to Cost Centers
Display of direct costs including all primary direct and support direct.
Control Gate 2
Decide to fold support costs to Primary C.C.s or compute costs without folding.
Step V
Fold Support Activity Costs into Primary C.C.s
Support activity costs are assigned to primary activity C.C.s
Step VI
Vertical Allocation of Indirect Costs
Display of direct and indirect costs. Each level sums to total cost in study.
Step VII
Activity Element Cost Computation
Activity cost divided by number of elements.
Control Gate 3
Selected Element Costs
Begin Program Costing
Step VIII
Program Credit Matrix
Credit registrations by academic program or university program
Step IX
Program Costing
Activity element costs multiplied by cells of program credit matrix.

Figure 1: Procedural Paradigm

regular accounts; T3 = expenditure transferring accounts, accounts to transfer the expenditure of money for, say, student supplies to the student, no institutional cost being incurred; and, T4 = auxiliary activities accounts, special expenditure transferring accounts which must not include overhead or profit to the institution), object of expenditure and, finally, an indication of how the amount was determined for the term under study (e.g., as a percentage of a fiscal year amount).

> Control Gate 1.
>
> Control by source of funding and object of expenditure.

For some purposes, not all of the costs of an institution can be treated simultaneously; only costs from certain sources may be of interest ("tax" money to legislatures, for example) and because different objects of expenditure are treated differently in the analysis, a sequential treatment is necessary. The control of included costs is accomplished here.

> Step III *Establish C.C. Display*
>
> Standard C.C.s augmented with local depts., courses, sections and some other divisions.

Because existing institutional account structures, regardless of their vagaries, are used as input, there is a need to partition the activities of the institution according to a "standard" array to promote consistency of analysis between terms and among institutions. This is accomplished in relative consonance with NCHEM's Program Classification Structure by establishing a Cost Center (C.C.) structure to be used in all analyses. An important deviation from the NCHEMS material is our rejection of the use of the term "Program" to describe collections of institutional cost centers. We reserve the term for use to describe subsequent aggregations of activity elements. The array of cost centers is an array of activities. These activities can not be uniformly grouped into cost centers at various institutions other than at rather gross levels; thus the display of "required" C.C.s is relatively small. The display of schools, departments, course and section C.C.s must be consistent with unique local practices. *Therefore, the detailed display of C.C.s according to HEGIS discipline as a uniform basis is rejected.* A display of student programs of study may be able to be built around the HEGIS discipline but used in Part II of the analysis *after* activity elements have been costed.

> Step IV *Allocate Costs to Cost Centers*
>
> Display of direct costs including all primary direct and support direct.

At this point in the study, the researcher has a list of institutional accounts in which is specified the amount included in the study and also a list of cost centers. The former is in essence a list of resources and the latter a scheme of activities being supported by the resources. The present object is to allocate the resources (T1 accounts) to the activities (C.C.s) using the criterion of resource utilization. This criterion is not easily stated in universal, operational terms. Minimally, close attention to the definitions of the cost centers is necessary. Costs from accounts directly supportive of primary activities are allocated to support activity cost centers. While the ultimate goal is to allocate *all* costs to primary activities, accuracy and consistency in this step affects two aspects of the analysis: first, costs from various support activity cost centers are "folded" to primary activities through the use of various algorithms; second, intermediate analyses may be conducted on the costs of maintaining support activities. There is no assurance of a one-to-one correspondence between C.C.s and accounts.

> Control Gate 2
>
> Decide to fold support costs to Primary C.C.s or compute costs without folding.

Primary activities and support activities can be costed separately and the study continued without allocating the costs of the latter to the former if needed for internal management. Because of differing accounting practices (e.g., charge back system) the results of such analysis lose comparability between terms (or institutions) and costs per credit are only partial costs and thus subject to misuse or misinterpretation.

> Step V *Fold Support Activity Costs into Primary C.C.s*
>
> Support activity costs are assigned to primary activity C.C.s.

Folding is the process of transferring costs from the support activity C.C.s to the primary activity C.C.s. The transfer is to be proportionate to the amount of support provided. Under the overriding principle of allocating costs in such a way as to reflect reality as well as possible, no universal rules can be established for all institutions; the sincerity and ability of the researcher is called upon. Provision has been made for the recording of the rule and parameters used in each allocation to document each study.

> Step VI *Vertical Allocation of Indirect Costs*
>
> Display of direct and indirect costs. Each level sums to total cost in study.

The present goal is to: 1) allocate (distribute) all costs downward to course sections or to research and public service projects (thus setting all cost centers above the lowest equal to zero); and then 2) aggregate costs upward so that each level contains the entire amount included in the study. Varied parameters may be used for the distribution but simple summation is used in Part 2. All costs allocated downward become *indirect* costs.

> Step VII *Activity Element Cost Computation*
>
> Activity cost divided by number of elements.

At this point in the study each course has associated with it a cost. Acquisition of credit registration data allows the calculation of costs per credit.

> Control Gate 3
>
> Selected Element Costs

While the array of Element Costs may be useful for some kinds of internal management, the goal of this procedure is to cost university programs. To this end, selected element costs are taken into the Program Costing Procedure of Step IX.

> Step VIII *Program Credit Matrix*
>
> Credit registrations by academic program or university program.

The ingredients of a program must be defined and displayed in terms of credit elements. Student programs may be defined in terms of courses actually taken by students, faculty recommendations or typical or "average" programs. Programs may be entire degree programs or part thereof, for instance, majors, minors or general education programs. University programs such as upper or lower level academic programs, general education programs or the like may also be displayed for costing. Generally, a program credit matrix will be established with program titles as the top marginals and program elements (identical to activity elements) as side marginals.

Step IX *Program Costing*
Activity element costs multiplied by cells of program credit matrix.

The costs per credit (Step VII) can now be multiplied by the number of credits of each course in each program to calculate total costs of each course dedicated to that program. Summing the course costs, total program costs are determined. Dividing these costs by the number of units (e.g., the number of majors) yields unit costs, the goal of the analysis.

CONCLUSION

This paper has summarized the *Manual* being prepared as a base for cost analyses at the University of Wisconsin-Eau Claire. The parentage provided by NCHEMS should be apparent as should several of the significant differences. Much remains to be done. Problems of both policy and application must be tackled: allocation formulas need continual review; replication problems must be met and solved; utility to determine marginal costs must be established.

Both the principles and procedures of the analysis must be improved: conceptual lacunae must be filled; extensive sensitivity tests must be conducted to determine areas where procedures can be simplified or must be more advanced to make levels of accuracy consistent throughout. The theory of certain procedures must receive attention; e.g., the convergence of the folding process (as described in the *Manual*) must be studied to determine the degree of detail necessary to execute the folding process consistently but simply.

Last, as much of the procedure as possible must be computer programmed to facilitate continuous analysis, simulation and the ability to reflect in institutional accounts the desired program funding changes.

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1. A detailed application of the steps of the cost analysis to an imaginary college is available through the authors.

A GRADUATED TUITION PROGRAM

Dr. Edwin F. Wilde
Beloit College

INTRODUCTION

Beloit College is a privately endowed, coeducational, nonsectarian liberal arts college specializing in undergraduate education. Three semester-length terms are offered each year, with students on campus an average of two terms each year. The 1971-72 total enrollment is approximately 1,750, with an average on-campus enrollment each term of approximately 1,150.

During the 20-year period from 1950 to 1970, the cost of attending Beloit College has increased by about 300%, an increase considerably greater than that of the cost of living (see Table 1). It has been clear for some time now that the college's tuition schedule precludes Beloit from being considered by many middle and low socio-economic status families. From 1950 to 1970, the socio-economic composition of the student body shifted dramatically (see Table 2).

TABLE 1

Comprehensive Fee Per Term

	1950	1955	1960	1965	1970
Tuition and Fees	$250	$380	$ 638	$ 950	$1,550
Room and Board	280	330	412	450	510
Total	$530	$710	$1,050	$1,400	$2,060

TABLE 2

Socio-Economic Level of Entering Classes*

	1950	1955	1960	1965	1970
High Status (percent)**	54	65	57	76	88
Middle Status (percent)	30	27	32	20	10
Low Status (percent)	13	6	9	3	2
Farmers (percent)	4	2	1	1	0

*Socio-economic grouping is based on parental occupation, the most commonly used measure of socio-economic status. The following definitions are in accordance with Associated Colleges of the Midwest and United States Census definitions:

High Status:	Professional, Technical and Kindred Workers; Managers, Officers, Proprietors, excluding Farmers
Middle Status:	Clerical and Kindred Workers; Sales Workers, Craftsmen, Foremen and Kindred Workers.
Low Status:	Operatives and Kindred Workers; Private Household Workers; Service Workers, Laborers, excluding Farmers
Farm Workers:	Farmers and Farm Managers; Farm Laborers and Foremen

**Percent of total in the categories of occupations listed. Categories such as deceased, retired, unemployed, or occupation not reported are not included.

United States Census Abstracts, available through 1968, show only a slight shift in the percentage of the population in the occupational categories.

The socio-economic imbalance in the student body occurred even though the college substantially increased its financial aid effort (see Table 3).

THE GRADUATED TUITION PROGRAM

A central objective of a Beloit College liberal arts education is that students be exposed to, and gain an understanding of, the world around us. To implement this objective the college provides a strong World Affairs Program and it requires an off-campus term of work, service, or research for graduation. The college consistently has invested financial aid money to enable foreign students to study at Beloit, and also has provided substantial financial aid support for domestic students. These commitments have helped to expose Beloit students to a variety of different cultures, both on and off campus. The homogenization of the socio-economic status of its student body, therefore, blunts one of the principal trusts of the college.

The financial aid program in operation at most private colleges and universities has not been effective at Beloit College in attracting a diverse socio-economic student body. Many students currently receiving financial aid grants come from families with high socio-economic standing. An increase in the size of the current financial aid program offered little prospect for success in attracting students with diverse socio-economic backgrounds.

One way to attempt to increase the socio-economic diversity of the student body is by a graduated tuition program. Here is how the program was constructed.

Initially, the total amount of money that the Class of 1976 must generate during the 1972-73 academic year was determined. This figure was $1,810,000 rounded to the nearest ten thousand dollars. It was obtained by subtracting from the budgeted income figure for the class the estimated amount of grants to be provided from current unrestricted funds. The budgeted class size was 460, the budgeted per

TABLE 3

Yearly Financial Aid Grant Expenditures

	1950	1955	1960	1965	1970
Restricted	$ 8,000	$ 35,000	$ 57,000	$146,000	$240,000
Unrestricted	19,000	66,000	83,000	222,000	502,000
Total	$27,000	$101,000	$140,000	$368,000	$742,000
Average per student	$25	$102	$132	$302	$568

term tuition charge was $1,650 and the current unrestricted funds slated for grants to the class was estimated at $270,000.

Next, the admissions office goal was established. During the past three years the size of the entering class has diminished from 550 to 525 to 465. It was believed that a graduated tuition program would be more attractive than fixed tuition so a goal of 550 was selected. Such a class size places no undue strain on either the faculty or facilities. Indeed, the distribution of students in academic areas may improve because educational research indicates that a larger percentage of students from middle and lower socio-economic status families major in science – an area currently lightly enrolled.

The maximum and minimum tuition levels then were established. It was decided after conferences with admissions office staff, the director of financial aid, and others that the tuition would be graduated from $500 to $1,650 per term. The maximum level was selected so that no one would be asked to pay a premium to institute the program. The single tuition level for the class would have been $1,650 and the actual cost of attending Beloit College is approximately $1,950. The $500 level was selected so that Beloit College could compete with the public universities in Wisconsin for students from low socio-economic status families. At the time the program was instituted, the state provided a tuition grant of $350 per term to each Wisconsin student whose family is at Beloit's $500 tuition level.

The amount of tuition to be charged was determined by taking the amount of taxable income as found on line 50, page 2, of the 1971 Federal Income Tax Form 1040, and adding 10% of assets – the same assets at the same value as calculated for the College Scholarship Service. The calculated amount is referred to as the "adjusted taxable income." Verification of the adjusted taxable income, except for the assets, is provided by filing the Internal Revenue Service Form 4506 together with a copy of the Tuition Determination Form. The parents, by signing the Tuition Determination Form, give the College permission to check their income tax form.

The tuition tables based on adjusted taxable income were constructed by analyzing the past three year's financial aid records. The tuition charge increases linearly from the minimum of $500 to the maximum of $1,650 – the equation was determined by the least square method of analysis. The tuition statistics in Table 4 are for families with one or two children in college. If a family has three or more children in college, the tuition is determined by the Director of Financial Aid. Not enough cases were available to obtain a meaningful formula for such families.

The guaranteed aspect of Beloit's tuition – assuring students no tuition increase from matriculation through graduation – will continue in the following form. The tables used to determine tuition remain the same for each class's college career. Whether tuition will increase, decrease, or remain constant depends on the adjusted taxable income and the number of children attending college. This information will be updated each year. Incoming classes will be subject to new tables.

Financial aid continues to be available, but not at last year's level. Only restricted monies are used to provide grants for students – that is, income from restricted endowment and restricted gifts from individuals foundations and the government. Loans and work opportunities are available to students as before. If, after determination of its tuition charge from the tables, a family believes financial assistance is needed, it may apply for aid through the usual College Scholarship Service process.

Finally, the question of the distribution of students paying various levels of tuition was addressed. The target distribution calls for an enrollment of 275 (50% of the class) at the $1,650 tuition level, 200 (36%) reasonably distributed between the $1,650 and $500 levels, and 75 (14%) at the $500 tuition level. This distribution was preferred to others studied because (1) the number of students paying the maximum tuition seemed reasonable, since there were 300 students the previous year requiring no financial assistance; (2) it yields a much more diverse socio-economic distribution than currently; and (3) it yields a sizable financial cushion. If current attendance rates continues, this distribution will generate $125,000 over the budgeted amount. A surplus of this magnitude was deemed necessary because of the risk involved to the college's modest endowment.

TABLE 4

Tuition For New Students Entering in September, 1972

For families with no other children in college in 1972-1973		For families with one other child in college in 1972-1973*	
Adjusted Income	**Per-term Tuition**	**Adjusted Income**	**Per-term Tuition**
Less than 7,000	500	Less than 8,000	500
7,000 – 7,499	520	8,000 – 8,499	515
7,500 – 7,999	560	8,500 – 8,999	540
8,000 – 8,499	605	9,000 – 9,499	565
8,500 – 8,999	645	9,500 – 9,999	590
9,000 – 9,499	685	10,000 – 10,499	620
9,500 – 9,999	725	10,500 – 10,999	645
10,000 – 10,499	765	11,000 – 11,499	670
10,500 – 10,999	810	11,500 – 11,999	695
11,000 – 11,499	850	12,000 – 12,499	720
11,500 – 11,999	890	12,500 – 12,999	750
12,000 – 12,499	930	13,000 – 13,499	775
12,500 – 12,999	970	13,500 – 13,999	800
13,000 – 13,499	1,015	14,000 – 14,499	825
13,500 – 13,999	1,055	14,500 – 14,999	855
14,000 – 14,499	1,095	15,000 – 15,499	880
14,500 – 14,999	1,135	15,500 – 15,999	905
15,000 – 15,499	1,180	16,000 – 16,499	930
15,500 – 15,999	1,220	16,500 – 16,999	955
16,000 – 16,499	1,260	17,000 – 17,499	985
16,500 – 16,999	1,300	17,500 – 17,999	1,010
17,000 – 17,499	1,340	18,000 – 18,499	1,035
17,500 – 17,999	1,385	18,500 – 18,999	1,060
18,000 – 18,499	1,425	19,000 – 19,499	1,090
18,500 – 18,999	1,465	19,500 – 19,999	1,115
19,000 – 19,499	1,505	20,000 – 20,499	1,140
19,500 – 19,999	1,545	20,500 – 20,999	1,165
20,000 – 20,499	1,590	21,000 – 21,499	1,195
20,500 – 20,999	1,630	21,500 – 21,999	1,220
21,000 or more	1,650	22,000 – 22,499	1,245
		22,500 – 22,999	1,270
		23,000 – 23,499	1,300
		23,500 – 23,999	1,325
		24,000 – 24,499	1,350
		24,500 – 24,999	1,375
		25,000 – 25,499	1,400
		25,500 – 25,999	1,430
		26,000 – 26,499	1,455
		26,500 – 26,999	1,480
		27,000 – 27,499	1,505
		27,500 – 27,999	1,530
		28,000 – 28,499	1,560
		28,500 – 28,999	1,585
		29,000 – 29,499	1,610
		29,500 – 29,999	1,635
		30,000 or more	1,650

*Tuition per term for families with two or more other children in college will be determined by the Director of Admissions.

CONCLUSION

The effects of the graduated tuition program have been noticeable at Beloit. The news release about it attracted nationwide interest and coverage. Inquiries about the program have been received from approximately 400 schools. The impact of the program on admissions is of course incomplete, but the following statements are accurate as of May 1. The number of applications increased 11% over the previous year. The admission goal of 550 appears to be attainable. Fifty-two percent of the applicants are at the $1,650 level, 8% are at the $500 level, 16% are between these levels, and 24% are as yet undetermined. In summary, the graduated tuition program seems to be working well, even though the short-range consequences still are not known in detail.

MEETING THE CHALLENGE OF OPEN ADMISSIONS AND MAINTENANCE OF ACADEMIC STANDARDS – PROGRAM EXPERIMENTATION WITH LIMITED INSTITUTIONAL RESOURCES

W. Sam Adams
University of Wisconsin, Oshkosh

The first part of the title: "Meeting the Challenge of Open Admissions and Maintenance of Academic Standards" was discussed at the 1971 Association of Institutional Research Forum. Based on the ideas expressed in that paper, several curricular experimental programs were initiated at the University of Wisconsin, Oshkosh, in the fall of 1971. It is the intent of this paper to explain how the programs were implemented within existing institutional resources and discuss some of the research findings to date.

BACKGROUND

Since 1966 the University of Wisconsin at Oshkosh has lowered its admissions requirements to the point where they can be called "open admission." The effect has been that a large number of "lower quarter" high school students have gained admittance into the university. In order to make faculty members aware of the shifts in freshman academic characteristics, the Testing Research and Services Office has periodically published institutional reports. In addition, Student Group Profiles (SGP) were constructed for each professor of a lower division course. The SGP is a computer printout (histogram) of student ACT test scores, high school rank, reading test scores, and college grade point averages.

Prior to fall 1971, the university had not made any concerted efforts to develop programs to meet the needs of a diversified student body. While honors courses were being offered along with the regular academic programs, no remedial or compensatory courses were available for students with fundamental deficiencies. As a result of these information distribution efforts, two university departments expressed concern to and requested assistance from the Testing Center in developing curricular procedures which would improve student individual learning. It was hypothesized that providing students with behavioral objectives before each unit of instruction would increase achievement while maintaining academic department standards.

THE ACCOUNTING DEPARTMENT EXPERIMENT

Conditions of the Experiment

There were ten accounting sections taught by five instructors during the fall term 1971. To account for instructor variability, each teacher was assigned to sections: one experimental, where students received behavioral objectives before each unit of instruction; and the other control, where students received similar instruction but no objectives. Departmental exams were constructed on the basis of behavioral objectives for all sections and administered four times over the period of the fall semester. Improved student learning would be determined if the behavioral objectives sections out-performed the non-objectives sections on the departmental examinations.

The business administration faculty wanted, in addition, a developmental section for students with identifiable deficiencies and an advanced section for those having exceptional backgrounds in accounting. Students qualifying for these two experimental sections were sent letters explaining that they could *volunteer* for the special sections in spring 1971. Success in this portion of the experiment would be determined if students in the developmental and advanced sections performed better than their counterparts in regular course sections on departmental exams.

Program Design

In addition to a new accounting text[1] which stressed accounting principles rather than bookkeeping, two technical reference books were used in developing behavioral objectives: Bloom[2] and Mager[3].

> A behavioral objective may be defined as a statement specifying desired student learning outcomes. It is an *intent* communicated by a statement describing a proposed change in a learner – a statement of what the learner is to be like when he has successfully completed a learning experience. An objective describes a pattern of behavior (performance) the instructor wants the learner to be able to demonstrate.

There are two basic elements to a behavioral objective: (a) content, which is the subject matter to be learned; and (b) behavior, which is the cognitive level required by the student to master the objective. For example, the first objective of the Financial Accounting course stated: "The student will be able to *recognize* an accurate definition of 'financial statements'." The italicized word specifies the *thinking process* (behavior) the student is expected to perform for mastery of the task; i.e., he would be expected to identify the best definition, out of four, in a multiple-choice test item. The words "financial statements" in the above objective describe the content, i.e., the subject matter the student is expected to learn.

Table of Specifications

Table 1 illustrates the first unit's content categories and behavioral levels which received the greatest emphasis in the text and lecture. Behavioral levels range from simple recall activities (knowledge level) requiring only memorization of material, to highly complex intellectual processes (evaluation level) which involve thorough understanding of material and the ability to apply, analyze, synthesize, and

TABLE 1

Table of Specifications Instructional Unit I and Examination I

	Behavioral Levels						
Content Categories	Knowledge	Comprehension	Application	Analysis	Synthesis	Total Content Category	
	n	n	n	n	n	N	%
Purposes & Types of accounting	8	1				9	13
.						.	.
.						.	.
Accounting cycle	4		1		1	6	9
.						.	.
.						.	.
Total Behavioral Level N	51	6	7	1	1	66	–
%	76	9	11	2	2	–	100

evaluate important concepts. It is a hierarchical design of mental processes; e.g., the comprehension level includes knowledge skill, whereas the application level encompasses knowledge and comprehension skills.

The format of Table 1 provides the number of objectives falling into each unique cell. For example, the content category "Accounting Cycle" and the behavioral level "Knowledge" cell has four objectives which met both requirements. Percentages were added onto the horizontal and vertical axes of Table 1 to give teachers a proportional purview of content and learning behavior.

Since this was the first unit in a beginning professional course sequence, about three-fourths (76%) of the objectives dealt with knowledge-level behavior. That is, the student was expected to deal with the subject matter at an elementary level by memorizing facts, terms, and definitions. As the course progressed, the student became more involved in application-level behavior, which required him to draw upon previously learned principles to solve novel accounting problems.

Course Examinations

To assure uniformity of course content, common unit examinations were administered. Three unit tests and a final comprehensive exam were given during the period of the semester. All ten accounting sections were tested for approximately 1½ hours on weekday evenings in large classrooms or lecture pits. Each instructor was responsible for administering each test to his class sections.

Each examination was constructed on the basis of the proportional content emphasis and level of behavior expected, as set forth in the table of specifications for that unit of study. That is, for every objective there was at least one test item constructed to measure student mastery of that objective.

Each instructor submitted sample multiple-choice questions to measure stated behavioral objectives. All instructors individually evaluated the composite of questions collected prior to the formation of each test. At a group session, instructors collectively determined which test items best measured the objectives. The primary source of questions was the instructor's manual for the accounting text. However, many appropriate questions came from instructors' previous test item pools. The following is a sample test item from examination I:

26. The payment of dividends directly affects:
    (1) The balance sheet.
    (2) The income statement.
    (3) Both the balance sheet and income statement.
    (4) Neither the balance sheet nor the income statement.
    (5) Some other answer.

Test Item Analysis

In order to determine the relative degree of student comprehension of the subject matter and distinguish between those who had a good grasp of a particular unit of study and those who had minimal understanding of the material, item analysis was performed on each test. The degree of comprehension of each question was measured by the "difficulty index" technique, which simply provides the percentage of students answering the item correctly. A "discrimination index" produced a phi coefficient which indicates the relative efficiency of an item, i.e., differentiating between students scoring highest on the total exam and those scoring lowest on the total exam.

Test Item Pool

After each examination, test items were cut from one examination copy and placed on a 5 x 8 index card. This procedure was performed in order to have all test items in a usable form for developing valid examinations when Financial Accounting is offered again.

Program Limitations

(a) The organization of course content and method of instruction tended to follow the structure of the text, since the instructors agreed on a common text for all ten accounting sections.

(b) A limited training period to familiarize instructors with behavioral objectives terminology was available; therefore, behavioral objectives were used as an instructional tool rather than an integral part of instruction.

(c) Released time for faculty was not available; therefore, faculty group planning was limited to 1½ hours per week.

(d) It was difficult to control the sharing of objectives among students in the control groups, since seven of the ten sections received the objectives.

(e) Special methods and techniques for meeting the needs of the developmental or the advanced class sections were restricted to a few general guidelines due to limited resources.

(f) Students involved in the experiment were 369 sophomore whose academic characteristics included an average ACT composite score of 22 (about the 67th percentile on national college-bound ACT norms), a mean high school rank of 50, and freshman college grade-point average of 2.37.

Program Findings – Student Test Scores

Average Group. Those students who had objectives in average sections did *not* out-perform students without objectives who were enrolled in comparable sections taught by the same instructor. This result can be partially explained by the limitations stated above; i.e., we found students who were not supposed to have objectives obtaining them from their roommates or their informal study partners. Another factor was that the two instructors who taught the average sections did *not*, admittedly, stress the objectives in their experimental classes. The attitude was that the objectives were supplemental to instruction rather than an integral part of the learning process.

Developmental Group. Students who qualified for this special section had a freshman GPA below 2.0 or C. They did not achieve significantly higher test scores than students of like ability in the same professor's average class section. This was a disappointment, since a graduate student in accounting was especially assigned to help the special section of students. However, it was not unpredictable, since very few (2 out of 20) students regularly took advantage of the extra tutorial assistance. In addition, a locally constructed academic motivation instrument showed decisively that the developmental students were far below comparable students in the average class.

Advanced Group. Students who qualified for this special section had a freshman GPA above 3.0 or B. As in the special section results above, the advanced section students did *not* receive higher test scores than similar students enrolled in an average section taught by the same instructor. Although the advanced section students did have scores generally higher than their peers in the average section, the differences were not statistically significant. The teacher admittedly did nothing extra except to have two outside speakers talk to his special class section during the term. Therefore, the same teaching procedures were followed for both accounting classes, and the fact that one group was ability grouped, while the other was not, did not have a discernible effect on student test achievement. Also, the academic motivation instrument used did not differentiate one group from the other.

PROGRAM FINDINGS – STUDENT EVALUATION OF BEHAVIORAL OBJECTIVES

An informal instrument was constructed to determine how the students valued the behavioral objectives. It was felt that academic achievement gains for those having the objectives over those not possessing them was only one view of the objectives' true value.

In general the results were favorable, but there were a number of exceptions. The results reported below are from 161 students who used the objectives and who responded to the "Evaluating Instructional Objectives" questionnaire. Only statements showing the decisive reactions of students are reported here; overall reactions may be obtained from the author.

(a) Over half (56%) agreed that the objectives helped them organize their class notes and study notes. In contrast, 14% disagreed and 30% were neutral.

(b) Almost two-thirds (65%) thought the objectives related closely to the test items on exams, whereas 15% disagreed and 20% were neutral.

(c) Almost three-fourths (73%) did *not* review the objectives before going to class; however, the same proportion (73%) used the objectives *only* prior to an exam and three-fifths (60%) made *extensive* use of the objectives in preparing for the exams.

(d) Over four-fifths (84%) said that teachers were willing to answer questions related to objectives; however, one-third (36%) to almost half (46%) of the students indicated that the teachers did *not* explain their lectures in terms of objectives or refer to the objectives often in class.

(e) Over two-thirds (70%) of the students agreed that after having objectives for their accounting class, they would like to have objectives for other classes; only 5% disagreed with this statement.

THE ECONOMICS DEPARTMENT EXPERIMENT

Although not as comprehensive as the accounting department's experiment, one instructor in economics spent as much time in designing a Principles of Economics course as any one accounting teacher spent in working on his course. The procedures followed in the economics program were identical to the step-by-step methodology used in the behavioral objectives portion of the accounting program. No attempt was made to ability-group students in economics. The primary aim of the economics experiment was to determine if behavioral objectives could significantly improve student knowledge of economic principles.

Conditions of Experiment and Program Design

Three sections of Principles of Economics I were taught by one instructor in the fall 1971. One section was randomly assigned as the experimental section, which meant students would receive behavioral objectives prior to each unit of instruction. The remaining sections acted as control groups, where students were not given objectives but were taught the subject matter in the same manner as the experimental group.

Behavioral objectives were written on each of the three instructional units, and tables of specifications were contrived to organize the specific objectives into more generalized topics of instruction. The three course tests were based on content and behavior specified by each unit's table of specifications. Although the tests were not identical for each class section, they were sufficiently similar in difficulty and content to be considered equivalent. Test item analysis and a test item pool were developed subsequently to each course test.

Program Limitations

(a) No released time was available for the economics instructor to thoroughly develop the course; therefore, only limited time was spent on designing and implementing behavioral objectives.

(b) The instructor did attempt to make behavioral objectives an integral part of instruction; however, more time was needed to fully develop the technique and evaluation instruments.

(c) Although the class having objectives was cautioned not to share objectives with other classes, it was impossible to maintain strong control.

(d) The course population consisted of 142 students who were primarily sophomores and had an average ACT composite score of 22.5 (about the 70th percentile on national college-bound ACT norms), a mean high school rank of 65, and freshman college grade-point average of 2.51.

Program Findings – Student Test Scores

According to ACT scores and high school rank criteria, one of the control groups had higher academic qualifications than the experimental group and the other control group. Even though the groups were not statistically different from one another by the preexperiment criteria, it was felt that one control group was superior. The experimental group and the

Presently, detailed analysis is being made on the data to determine if the original difference between groups could have effected the outcomes. Over the period of the term, *no* class test showed any statistically different results between the experimental group and the high control group. However, on two of the tests, the low control group did receive significantly lower scores than the experimental and high control class sections.

Program Findings – Student Evaluation of Behavioral Objectives

The same instrument used to determine how students valued behavioral objectives in the accounting project was administered to the economics experimental group. The results were very positive, reflecting to a great extent the amount of effort the economics instructor put forth in this project. Only those items showing a high degree of concensus are mentioned here; complete results may be obtained from the author.

(a) A very high percentage (87%) felt objectives helped them organize their class notes and study notes, while only 5% disagreed and 8% were neutral.

(b) About four-fifths (79%) thought objectives helpful in guiding their reading assignments, whereas 3% disagreed and 19% were neutral.

(c) Over four-fifths (81%) stated that the objectives related closely to the test items on each exam; in contrast, 8% disagreed and 11% were neutral.

(d) Over four-fifths (81%) stated that the "content" parts of the objectives (subject matter) were clear and well defined, while 5% disagreed and 14% were neutral.

(e) Almost three-fourths (73%) agreed that the teacher explained his lecture in terms of objectives whenever appropriate, whereas 5% disagreed and 22% were neutral.

(f) A very high percentage (89%) thought the efforts in developing and giving the objectives were *not* a waste of time, while only 3% thought objectives were a waste of time.

(g) Almost all (98%) of the respondents said that the objectives gave them additional insight into what was important in the course.

(h) Just over three-fifths (62%) did *not* review objectives before going to class; however, about the same proportion (60%) used the objectives *only* prior to an exam, and 89% said that in preparing for exams, they made *extensive* use of the objectives.

(i) It was unanimous (100%) that the teacher was willing to answer questions related to objectives.

(j) Almost all (95%) of the students felt that, after having objectives for this class, they would like to have objectives for other classes they had.

CONCLUSIONS

As with any project as exhaustive as this one, the time available to develop all the ideas was limited.. The total effort budgeted within existing resources. Many hours outside the normal workday went into designing and implementing the basic programs and the experiments. Much additional analysis still needs to be completed before final conclusions can be made; however, the following comments seem to be logical deductions from the existing data.

Although student achievement scores did not increase significantly as a result of students having behavioral objectives, faculty and student attitudes about the use of objectives in establishing course design and implementing effective evaluation procedures were very favorable. Probably the most significant factor in influencing student academic performance through the use of behavioral objectives is the commitment the instructor makes in developing clear and precise objectives and valid and reliable testing instruments. The instructor's belief in the objectives must be that they are an *integral part of instruction* rather than a tool to supplement instruction.

With the increased emphasis being placed on program accountability and fiscal restraint in higher education, behavioral objectives and related testing instruments to measure the desired educational outcomes will become increasingly important. If college teachers do not begin to develop more explicit models of curriculum design and establish better stated performance criteria for their courses, there is a good chance that external agencies will impose their will and procedures on us.

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1. Ronald J. Thacker, *Introduction to Modern Accounting* (Englewood Cliffs, New Jersey: Prentice-Hall, 1971).

2. Benjamin S. Bloom *et al, Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook I: Cognitive Domain* (New York: David McKay Company, Inc., 1956).

3. Robert F. Mager, *Preparing Instructional Objectives* (Palo Alto, California: Fearon Publishers, 1962).

IMPROVING ADMINISTRATIVE DECISIONS ON TEACHER EFFECTIVENESS

LeRoy A. Olson
Michigan State University

Traditionally, ratings on which decisions regarding instructor effectiveness are based have come from three sources: students, peers, and administrators. The decision-making process has usually been extremely informal, and the ratings used have been far from objective, and have usually been obtained in a haphazard manner. There seems to be a nation-wide movement, perhaps accelerated by ominous noises concerning accountability currently emanating from state legislatures, to objectify and systemize the rating process. This would include the development of rating forms, of data gathering systems, and of standardized methods of interpreting data. Let's concern ourselves primarily with the rating of instructors by students.

There are three major purposes for which student ratings of instruction are often used. One purpose is to provide instructors with systematic feedback on student attitudes toward their instruction. Such feedback should help instructors to improve their techniques and materials, and aid in the evaluation of instructional innovations. In this way, student ratings may have their most direct and immediate impact on the quality of the instructional program of a university. The Student Instructional Rating System (SIRS) was developed several years ago with the specific purpose of facilitating feedback of student attitudes to instructors. While SIRS was a new system, it was not a new concept, since it replaced a student rating form which had been available to faculty for 20 years.

A second major purpose of student rating of instruction is to provide data to be used in the decision-making process with respect to retention, tenure, promotion, and salary adjustments. Shortly after the introduction of SIRS, the academic council of Michigan State University passed a resolution requiring the administration of SIRS forms on a systematic basis by all faculty members, and that the SIRS reports be used by the departments in determining the individual effectiveness of instructors. This use of student ratings of instructors should promote improvement on a long-range basis.

The third major purpose of student instructional ratings is to provide students with data on which to base their selection of courses and/or instructors. Students believe that they may have a significant impact on the quality of instruction simply by avoid industructors who consistently receive poor ratings, and who refuse to change. At MSU, the student need for instructional rating data is being met mainly by the students themselves, working through the student advisory committees of various departments. The communication of instructional rating data to students is inadequate, and needs to be improved on a university-wide basis.

No matter what use is made of student ratings of instructors, it is crucial that users be aware of any influences other than the performance of the instructor, such as the characteristics of a particular group of students, which might affect SIRS responses. To aid in the interpretation of student ratings of instructors, a study was carried out to determine the relation between SIRS responses and student characteristics such as previous grade point average, indicated grade point average, class, major, sex, current grade expectation, comparison of original to current grade expectation, instructor grade, final examination score, whether the course was required, whether the course was recommended by another student, and the number of previous courses in the department. The data were analyzed by multivariate regression analysis, with SIRS composite profile scores as dependent variables, and student characteristics as predictor variables. The SIRS composite profile factors, as described in Exhibit 1, are: instructor involvement, student interest, student-instructor interaction, course demands, and course organization. The hypothesis that there is no relation between SIRS composite profile scores and student characteristics was tested. Failure to reject the hypothesis would indicate that student attitudes toward an instructor are not dependent on the student characteristics tested in this study, and are probably primarily a function of the classroom behavior of the instructor.

The SIRS form was administered under three conditions. The first condition (identified supplement) included a SIRS supplement (Exhibit 2), on which the student indicated his name, student number, sex, class, major, current expected instructor grade, and comparison of current expected instructor grade to original expected instructor grade. The second condition (anonymous supplement) included an anonymous SIRS supplement, and the third condition was a normal, anonymous administration of the SIRS form alone. The hypothesis of no difference in SIRS responses under the three conditions was tested. The hypothesis of no difference in SIRS responses under identified and anonymous conditions was also tested.

Students in the sections receiving the SIRS supplement were asked to rate their instructors on three continua developed by Ryans in the *Characteristics of Teachers* study.[1] The continua included an autocratic-harsh-aloof versus democratic-kindly-responsive dimension, an evading-disorganized versus responsible-systematic dimension, and a dull-stereotyped versus stimulating-original dimension. The multivariate regression analysis had the three continua scores as dependent variables and the five SIRS composite profile scores as independent variables. Rejecting the null hypothesis would indicate that the SIRS form has construct validity, in the sense that SIRS responses could be used to predict responses to an independently developed instructor rating system.

Students in the sections receiving the SIRS supplement were also asked to classify themselves according to a modified Clark-Trow typology. The typology categories may be described briefly as vocational, intellectual, social, and individualistic orientations. The complete typology is shown in Exhibit 2. Past experience has shown that students who

EXHIBIT 1

Student Instructional Rating System

Composite Profile Factors (CPF) and Component Items

CPF 1: INSTRUCTOR INVOLVEMENT

1. The instructor was enthusiastic when presenting course material.
2. The instructor seemed to be interested in teaching.
3. The instructor's use of examples of personal experiences helped to get points across in class.
4. The instructor seemed to be concerned with whether the students learned the material.

CPF 2: STUDENT INTEREST

5. You were interested in learning the course material.
6. You were generally attentive in class.
7. You felt that this course challenged you intellectually.
8. You have become more competent in this area due to this course.

CPF 3: STUDENT-INSTRUCTOR INTERACTION

9. The instructor encouraged students to express opinions.
10. The instructor appeared receptive to new ideas and others' viewpoints.
11. The student had an opportunity to ask questions.
12. The instructor generally stimuated class discussion.

CPF 4: COURSE DEMANDS

13. The instructor attempted to cover too much material.
14. The instructor generally presented the material too rapidly.
15. The homework assignments were too time consuming relative to their contribution to your understanding of the course material.
16. You generally found the coverage of topics in the assigned readings too difficult.

CPF 5: COURSE ORGANIZATION

17. The instructor appeared to relate the course concepts in a systematic manner.
18. The course was well organized.
19. The instructor's class presentations made for easy note taking.
20. The direction of the course was adequately outlined.

GENERAL AFFECT ITEM

21. You generally enjoyed going to class.

STUDENT BACKGROUND ITEMS

25. Was this course required in your degree program?
26. Was this course recommended to you by another student?
27. What is your overall GPA? (a) 1.9 or less (b) 2.0 – 2.2 (c) 2.3 – 2.7 (d) 2.8 – 3.3 (e) 3.4 – 4.5
28. How many other courses have you taken in this department? (a) none (b) 1 – 2 (c) 3 – 4 (d) 5 – 6 (e) 7 or more

classify themselves as a particular type tend to select certain academic programs, and hold certain social and political views more often than others. If students who place themselves in different typologies hold different attitudes toward instruction, then typology classifications should be considered in interpreting SIRS responses. The hypothesis that students responding under identified and anonymous conditions select the same typologies was tested. Then the hypothesis that SIRS composite profile scores are independent of student typology self-classifications was tested.

Term-end achievement data, namely, scores on a common final examination and instructor grades, were used to test the concurrent validity of the SIRS item "You have become more competent in this area due to this course."

The relation of SIRS composite profile scores to term-end achievement was studied, using achievement test score

EXHIBIT 2
SIRS Supplement

Give the information requested on the right. Then complete the ratings below. Your responses will be held in the strictest confidence by the Office of Evaluation Services. Your responses will not be shown to your instructor.

NAME ____________________

STUDENT NUMBER ___ ___ ___ ___ ___ ___

SEX: M F (circle one)

CLASS: Fr So Jr Sr Other (circle one)

MAJOR: ____________________

What instructor grade do you expect in this course? ____________

How does your current instructor grade expectation compare with the instructor grade you expected to get at the beginning of the term?

Original expectation was: (circle one)
Higher
Same
Lower

Rate your instructor on the three dimensions of classroom behavior listed below. Circle the number which represents your rating on each dimension.

Dimension 1

autocratic harsh aloof	1	2	3	4	5	6	7	democratic kindly responsive

Dimension 2

evading disorganized	1	2	3	4	5	6	7	responsible systematic

Dimension 3

dull stereotyped	1	2	3	4	5	6	7	stimulating original

Select ONE of the following statements which BEST describes you. Circle the number of the statement you choose. (Choose ONE only)

1. I am committed to a particular field of study and am in college primarily to obtain training for my chosen career.
2. I am primarily concerned with the scholarly pursuit of knowledge, and the cultivation of intellect.
3. I believe that the social and extracurricular activities of college life are just as important as the academic activities.
4. I am committed to a philosophy that emphasizes individualistic interests and styles, concern for personal identity, and often, contempt for any aspects of organized society.

and instructor grade as dependent variables and profile scores as independent variables. The hypothesis that SIRS composite profile scores are independent of student achievement variables was tested.

The final hypothesis was that there is no statistically significant difference between indicated and official grade point average, under identified conditions of administration. This is simply a check to indicate the degree to which student responses are reliable.

The sample consisted of all students enrolled in Social Science 231B, a general education course for sophomores, during the fall term of 1971. There were 13 sections taught by five instructors. Sections were assigned to treatments at random. The number of student respondents for each treatment group was: identified supplement, 365; anonymous supplement, 238; and SIRS form only, 85. SIRS forms and supplements were administered to the 13 sections during the final week of the fall term of 1971.

The hypothesis that there was no difference in SIRS responses under identified supplement, anonymous supplement, and anonymous regular conditions, was tested for two instructors who each had one section under each condition. The hypothesis was rejected with $P<.02$. However, the statistical significance appears to be due almost entirely to composite profile factor three: student-instructor interaction. Analysis by SIRS items indicates that item 12, "The instructor generally stimulated class discussion" is the most statistically significant contributor to this result. Items 9 and 10, "The instructor encouraged students to express opinions" and "The instructor appeared receptive to new ideas and others' viewpoints" also contributed relatively more than other items to the statistically significant result. Inspection of cell-means shows that students were most favorable in their ratings of student-instructor interaction when they were required to identify themselves. However, the most striking difference appeared between the ratings when students were anonymous but also filled out a SIRS supplement, and the much less favorable ratings when they anonymously filled out a SIRS form only. These results indicate an experimental effect, a tendency for students to rate student-instructor interaction more favorably when they perceive the SIRS administration as part of an investigation. In summary, student ratings on the instructor involvement, student interest, course demands, and course organization factors do not vary significantly under identified experimental, anonymous experimental, and regular anonymous conditions. Students rate student-instructor interaction most favorably under identified conditions and least favorably under regular anonymous conditions.

The hypothesis that there is no difference in student ratings under identified supplement and anonymous supplement conditions was tested for four instructors. The hypothesis of no treatment main effects could not be tested due to a statistically significant interaction effect ($P<.02$). In this case, the course demands and course organization factors were by far the most significant contributors to the interaction. The student-instructor interaction factor made a moderate contribution, while the instructor involvement and student interest factors contributed little to the interaction.

The external validity of this study is severely limited by the presence of a statistically significant interaction between instructor and method of SIRS administrations. The following results are based on SIRS administration under identified conditions and cannot be generalized to regular anonymous administrations.

The hypothesis that there is no relation between student characteristics and SIRS responses was soundly rejected ($P<.0001$). For the first analysis, the predictors were arranged in the following order: previous grade point average, grade expectancy, instructor grade, final examination score, number of previous courses in the department, sex, whether the course was required, whether the course was recommended by another student, indicated grade point average, comparison of current instructor grade expectation to original instructor grade expectation, major, and class. It was found that six of the above 12 variables were not statistically significant predictors of the dependent variables, namely, the SIRS composite profile scores. Sex was a statistically significant predictor ($P<.03$).

For the second and final analysis, the remaining variables were entered in the following order: previous grade point average, sex, grade expectancy, instructor grade, indicated grade point average, and final examination score. Overall, the six variables had a statistically significant relation to the SIRS composite profile scores ($P<.0001$). The procedure revealed that the variables, instructor grade, indicated grade point average, and final examination score, were not statistically significant predictors of SIRS composite profile scores. Grade expectancy was a statistically significant predictor ($P<.0001$).

Thus the three student characteristics which showed statistically significant relationships to SIRS composite profile scores are: previous grade point average, sex, and expected instructor grade. The correlations between these three predictor variables and the SIRS composite profile scores ranged from $r = -.01$ between sex and the student interest score, to $r = .24$ between grade expectancy and course demands scores. Thirteen of the 15 correlations between the three statistically significant predictors and the SIRS composite profile scores are below .15. Even the predictor having the highest correlation with a specific composite score, namely, grade expectancy, accounts for less than six percent of the variance in the course demands score. With one exception, all of the correlations between student characteristics and SIRS composite profile scores are below .20, and 44 out of 60 correlations are less than .10.

The proportion of SIRS composite profile factor score variance accounted for by the selected student characteristics is indicated by the squared multiple correlations. The squared multiple correlations are: instructor involvement – .09, student interest – .07, student-instructor interaction – .06, course demands – .15, and course organization – .10.

A reasonable conclusion, based on the above data, is that while there is a statistically significant relation between student ratings of instructors and student characteristics, the correlations are generally quite low, and the proportion of variance accounted for is small.

The fourth hypothesis in this study predicted no relation between the five SIRS composite profile factors and three main factors from Ryans' study. The Characteristics of Teachers Study (CTS) factors are: authoritatian-democratic, evasive-responsible, and dull-stimulating. The hypothesis was rejected at beyond the .0000 level ($X^2 = 814.5$

with 15 d.f.). The three CTS factors correlate more closely to the most directly related SIRS composite profile factors ($r = .66$ to .67) than to the other factors ($r = .26$ to .55). An argument for construct validity of the SIRS composite profile factors is that the correlations between these factors and the most closely related (in a semantic sense) CTS factors are substantial. The situation is confused by the substantial intercorrelations for both SIRS composite profile factors and CTS factors. The construct validity argument rests on the fact that the SIRS composite profile factors and the CTS factors were developed independently, using different approaches for the identification of significant aspects of the instructional process.

These results indicate that it may be possible to construct a set of five criteria, similar to the CTS dimensions, which would account for most of the SIRS composite profile score variance. Thus, as much information could be gained about an instructor by using five items as with 20 SIRS items. The result would be an efficient summary for determining the individual effectiveness of instructors.

Hypothesis 5 was rejected at the .03 level of probability, since experimental-identified students and experimental-anonymous students classified themselves on the typology in significantly different patterns. Experimental-identified students more often classified themselves as social or individualistic types, while experimental-anonymous students more often classified themselves as vocational or intellectual types. The greatest differences were in the proportions of each group selecting the vocation and individualistic typologies.

Since H_5 was rejected, hypothesis 6 – that there is no relation between SIRS composite profile scores and typology classifications – was tested separately for the experimental-identified and experimental-anonymous groups. The test failed to reject hypothesis 6 for either group.

The hypothesis of no relation between responses to SIRS item 8, "You have become more competent in this area due to this course" and final grades was rejected ($P<.0006$). The correlation between Item 8 responses and final examination scores was $r = .05$. The correlation between Item 8 responses and instructor grades was $r = -.20$. (The negative correlations result from the manner in which Item 8 was scaled.) These results indicate that a student's response concerning his increase in competence may be based on feedback he has received from the instructor in terms of quiz scores, grades on papers, etc. Thus, the student's estimate of his competence is more closely related to instructor grade than to scores on a common final examination.

Hypothesis 6 was rejected ($P<.0016$). The SIRS composite profile factor scores are not independent of student achievement variables. The SIRS composite profile factors most highly weighted in the equation to predict final examination score are student-instructor interaction ($r = .09$), and course demands ($r = .10$). The SIRS composite profile factors most predictive of instructor grade were course demands ($r = .16$) and instructor involvement ($r = .16$).

The correlation between indicated grade point average (from the SIRS form) and official grade point average (from the student master record) was $r = .78$. The mean indicated grade point average was 2.57, while the mean official grade point average was 2.78. This difference may have been due to the response categories on the SIRS form, which are a nonlinear transformation of the grade point average scale. The test for the difference between two means for correlated data resulted in $t+1.<$ Thus, we failed to reject hypothesis 9, which stated that there is no difference between indicated grade point average and official grade point average, under identified conditions of SIRS administration.

SUMMARY

Students respond differently to SIRS items under different conditions of administration. The results of this study, which are based on SIRS responses made under identified conditions, cannot be generalized to SIRS administrations under regular anonymous conditions.

There is a statistically significant relation between SIRS responses and selected student characteristics: previous grade point average, sex, and expected instructor grade. However, the correlations between SIRS composite profile scores and selected student characteristics are generally low, so that only a very small proportion of the variance in SIRS responses is accounted for by student characteristics. In a practical setting, SIRS responses may be interpreted without considering student characteristics.

The relation between SIRS composite profile scores and the three main factors identified by Ryans in his study is high, indicating construct validity of instructor evaluation factors developed by quite different approaches.

Students' estimates of their increase in competence due to a course are significantly related, in a statistical sense, to their term-end achievement data. The relation is much higher for instructor grade than for common final examination score.

SIRS composite profile scores are significantly related, in a statistical sense, to student achievement variables, but the proportion of variance accounted for is small.

While experimental-identified and experimental-anonymous respondents classified themselves in significantly different patterns on a student typology, SIRS composite profile scores are not related to typology classifications for either group.

There was no statistically significant difference between grade point averages indicated by students and their official grade point averages.

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1. D. G. Ryans, *Characteristics of Teachers: Their Description, Comparison, and Appraisal* (Washington, D.C.: American Council on Education, 1960).

THE EVALUATION OF EDUCATIONAL CHANGES IN HIGHER EDUCATION

Robert R. Wright
State University of New York

A few years ago, to speak of innovation meant to single out a few unusual educational projects which, in contrast with the general approach to higher education, were considered exceptional. Today, it is hard to draw a line between innovative projects and the general processes of higher education because the latter are evolving at such considerable speed. Innovation has often been a *new* way of doing an *old* thing. On the other hand, I believe that in finding *new* ways to do *new* things, we will find more productive ways to adjust higher education to its current and future roles.

WHY EVALUATE?

Institutional researchers are frequently brought into innovative projects which are already under way or being planned. Many, if not a majority, of such projects are simply ways of obtaining funds and resources for a new approach without that full commitment to evaluation or experimentation which might be expected under the label of "experimental project." Nevertheless, those agencies supporting innovative and experimental projects usually require at least a modest attempt at describing the project in considerable detail or evaluating its results. Rather than attempting an extensive definition of evaluation, this paper describes what evaluation does and why it should be an integral part of most innovative projects in higher education. One definition says that:

> Evaluation assesses the effectiveness of an on-going program in achieving its objectives, relies on the principles of research design to distinguish a program's effects from those of other forces working in a situation, and aims at program improvement through a modification of current operations.

A quick review of the reasons why we do evaluation will be useful in setting the stage for an understanding of how evaluation can be conducted on innovative projects in higher education.

Evaluation helps protect the leadership of a project from self-delusion which normally accompanies the missionary fervor in such instances. A well-designed evaluation can provide desirable protection from those outside the project who might be antagonistic or at least skeptical of mere narrative or opinions about accomplishments. Evaluation can help to certify genuine accomplishment while curbing premature enthusiasm. Evaluation can help tell whether the expense of a new program is greater or less than the value of the results obtained. The disciplined observation of evaluators may turn up unexpected results for program improvement. The specific findings of evaluations are usually less important than the conceptualizations they may generalize regarding overlooked variables, insignificant impact, differences between control and experimental groups, and other information of value for decision-making.

In undeveloped and newly independent countries, educational research has become intimately identified with educational planning. It may also be that the planning of experimental colleges is, at its core, a formalized scheme for evaluation. "Evaluation is intimately bound up with a program's administrative design, the provision for evaluation within the design, the nature of program objectives, and the specific means for achieving those objectives."[1]

And yet it will be a courageous administrator of an innovative project who is willing to trust the results of evaluation alone for the major guidelines to program changes. When the shape of a program is fixed either by the stubborn personality of its creator or by political forces, effective use will seldom be made of the evaluation findings. Such projects usually result in evaluation being a peripheral and rarely influential source of input to decision-making. Program administration usually requires some form of social accounting, such as enrollment statistics, censuses, faculty salary data, etc., in the form of data banks for the general user; however, evaluation for administration is more than these. It is usually decision-oriented where the information has been sought by a decision-maker. It is commissioned; that is, there is usually some loss of freedom for the investigator who must conduct his study relevant to a particular institution at a point in time.

Evaluation can become a methodology for training and change, as well as for gaining new knowledge; on the other hand, the use of "action research" as simply a way of manipulating a faculty to move in a certain direction cannot be condoned. Research and evaluation should have a chance to stimulate a group's ability to diagnose and solve its own problems, and its readiness to apply scientific procedures to the broader evaluation of its objectives and operations, once taught how. It is the role of the evaluator to teach how. It is rare indeed to find an innovative program whose leadership considers evaluation to be one of the highest objectives of the project itself in the experimental period. This may be because the many experiments do not deal with major educational outcomes which are deeply cared about, and the present practices may not be sufficiently ineffective.

In spite of the incontestable value of evaluation in innovative programs, two major cautions should be underscored. First, it is possible for an expensive inquiry or evaluation to yield nothing of value. Second, evaluation may not produce all the answers because of the prevailing myth that new practices can be derived from research findings about the present. Evaluation cannot point out what *should* be done, but it can tell what *is* being done (and not done).

WHAT ARE WE TO EVALUATE?

Beginning with the learning of the individual student, the most important initial decision for a teacher is to specify his instructional objectives in a language that permits the students to see themselves moving toward these goals. The professor and the students should know what evaluation is intended *before* the course begins. There is common agreement that only after objectives and program aims have been specified can their obtainment be measured. Criterion variables must be accessible to observation and measurement, and the objectives must be specific enough to permit measurement or observation.

Most objectives stated by managers of innovative programs will be quite abstract, but they can nevertheless be written in terms of how the student will demonstrate his knowledge. It is the evaluator's responsibility to press for an agreement on observable objectives to be evaluated.

As McDill has said:

> Negative evaluations will have their political consequences and if one can possibly live with essentially unmeasurable objectives, the possibility of negative findings is precluded . . . If vagueness of goals is the bane of the evaluation researcher, it may be the salvation of the program administrator. Frequently, in the face of inprecise objectives, the evaluator finds that *he* must make the criteria operationally specific. He does so as best he can and proceeds with his research. Should he produce findings which are unflattering to the program, any of its proponents . . . can attack him on the grounds that the "true" objectives of the program were not understood. There is the same kind of utility in having multiple objectives. If an evaluator declares that the program has failed to fulfill one objective, its defendents can then stress the importance of the ones that were not measured. If one's goals are not specified at the beginning of a program, the freedom to announce them at some later date is pretty well assured and serves as a political safety measure.[2]

Jerome, in *Culture Out of Anarchy*, his book on experimental colleges of various types, sounds an alarm against extensive traditional evaluation when he says: "We cannot know, without unwarranted intrusion, whether people are learning or not – and what the quality of their learning is." He goes on to say:

> The assumption seems to be that unless you have something to send to the registrar, experience and learning are wasted and invalid. The rewarding experiencies of our private lives (a book, lovemaking, a meal, a symphony) are rarely approached with defined objectives, are rarely evaluated. How can we learn to relax with the fact that we may *never* know what our students have learned – and that, in a sense, it is no more our business than it is the librarian's business what readers get out of the library's books.[3]

WHO SHOULD DETERMINE THE VARIABLES FOR EVALUATION?

The most common source of evaluation criteria is the faculty, but there are several problems in using only faculty as the determiners of evaluation. There is often an unconscious (and perhaps intentional) tendency to choose variables that are likely to show progress even without an unusual or unique experimental program. In addition, what administrators and staff think the program is doing may not be a comprehensive view. For example, students may indicate that the program also consists of other less positive aspects, or they might not even recognize what the faculty said it was doing. Students in experimental programs can become an important source of identification of the variables to be evaluated. Having the research staff allocate a considerable amount of its effort to the interests students have about their own program, would help control the problem of the inherent bias of faculty and administrators. Faculty, administrators, and students together might develop a joint responsibility statement to be used as a stimulus for progress and a benchmark for later evaluation.

Obviously, the objectives of a program's sponsor must be considered, as well as those of the beneficiaries, administrators, and staff. Having clear sponsor's goals is an important part of the planning of a project so that both parties are satisfied when the evaluation is completed and when the program is being considered for further support.

And who shall judge the meaning of the findings? It would seem most desirable, particularly in experimental projects as we have been discussing, that all those participating in the experiment (the leadership and the beneficiaries) should have an opportunity to interpret and present conclusions based upon the common findings. In addition, study committees might be set up to review the findings and make recommendations for follow-through; in this way, the evaluators can be freed from the responsibility of making recommendations, and a broader base is provided for the recommendations.

WHAT MIGHT BE USEFUL VARIABLES?

When an innovative educational program is being run simultaneously with the more traditional program, it is common to find that questions are asked about the new program in relationship to the old; i.e., is the new program as good as the old on the same variables? A dilemma may occur when the new is as good as the old, but *neither* may be accomplishing their purposes. Those promoting a new program are likely to say that it accomplishes objectives which the old program could not accomplish. If both the traditional and the innovative programs are evaluated against common objectives, as well as against those unique to each specific program, the merits and deficiencies of each may be examined.

In the process of choosing variables which are to be the basis for the evaluation, an abundance of variables should be suggested. The difficulty, however, is in selecting from among these variables those which can be measured and which contribute to the understanding of the educational influence of the curriculum. One way of cutting away irrelevant variables is to focus on the individual student as the unit of learning and also as the unit for evaluating the curriculum's educational influence. Because students are prone to claim that traditional curricula are "irrelevant", we search for more "relevant" approaches. Since relevance differs among students, experimental programs must either be individualized or wrestle with an ill-fitting conformity. It will, therefore, be necessary to determine the individualized sets of objectives which individual students may have because of their personal preferences, experience, or interests.

Before taking up categories of individual variables which experimental programs might consider, a word is necessary about the feasibility of identifying uncontaminated variables from empirical data. Evaluation in the educational setting is especially prone to uncontrolled variation which becomes a major hurdle to interpretation. For example, students can only rarely be placed randomly into treatment groups in order that the uncontrolled variation could be properly assumed to be distributed randomly across both experimental and control groups. Variables related to one outcome may not necessarily be related to the others and may in fact provide interactive cancellations of the effects of the entire program. These interactions of variables can sometimes be controlled by focusing the evaluation design separately on parts of the program to identify sub-aspects which may be positive even if the overall result is neutral or negative. An example of such sub-aspects would be the skills gained even though a person might have felt humiliated by a particular tutor, or, the experimental program's influence on change in other institutions even before its general ineffectiveness had become known.

There is often a strong tendency to become convinced that the variables most worth measuring are those which are included in nationally available instruments such as the College Student Questionnaire of the Educational Testing Service, the Institutional Self-Study program of the American College Testing Program, and other institutional research instruments. We must avoid the common retreat from significant variables toward those which have an "elegance" or ease of measurement. Another common (but quite inadequate) measure used in evaluation are course grades or grade-point averages. Assessing the achievement of a student in terms of his own progress without access to the convenient grading crutch of the class performance curve is a necessary objective in evaluation. It has been found repeatedly that individual faculty members grade students differently for the same course, as well as on different bases for courses in other departments. It is ironic that many of our experimental programs, avowedly unique, still force each student's learning experiences through a graded, credit hour translation, while throughout higher education there is substantial challenging of the credit hour concept, the traditional measure only since its adoption as a variant of the Carnegie Unit. At first glance, giving learning experiences a credit equivalence seems the best way to meet the established requirements for degrees; upon inspection, this process of equating is very subjective and open to considerable disagreement even among those who promote a freer form of higher education. Will final, credit-granting criteria measures be the same as those being researched in the evaluation phase? Students are resentful of a double standard evaluation scheme which holds up more traditional criteria for them than for the program itself.

Consideration should be given in the evaluation plan for evaluation to be both of short-range and of a longer duration. Knowing the duration of experimental program effects is very important for two reasons: there may be a lag before the effects appear, and there may be a rather substantial drop-off soon after the student completes the program. Substantial commitment of effort and resources must be made for effective followup evaluation.

Suchman[4] suggests five categories of program evaluation by which the success or failure of a program may be evaluated and which are generally expected to be found in thorough evaluation plans: (a) effort, the quantity and quality of activity disregarding the output; (b) effectiveness, the results of applying effort towards clear objectives; (c) impact, the degree to which the effective performance is adequate to the total amount of need; (d) cost effectiveness. alternatives compared in terms of their costs, or the ratio between the effort and the impact as defined here; (e) process, the analysis of the processes the program uses to produce its results, which is a descriptive and diagnostic type of evaluation likely to discover unanticipated positive and negative side effects of the program.

CONSTRAINTS

Two types of constraints are usually found in evaluative research. The first is the lack of independence which the evaluator has in choosing his variables, manipulating his subjects, and reporting his results – in contrast to researchers in general. Any new program may come under considerable scrutiny by the funding authorities, the accreditation associations, state budget officers, local administrators, executives of a central coordinating group such as a state-wide coordinating council, and others. Under these circumstances, frustration is certain to be present if the evaluator is unable to develop the continued support of *all* of these individuals, as well as the need for objectivity in obtaining and interpreting the research results. He must be able to balance these pressures.

The second major restriction on the quality and success of evaluation plans is the underestimation of the resources necessary to conduct them. An evaluator is less likely to make this error than program administrators, but it is essential that manpower and other expenditures for evaluation be secured in the face of the more immediate and more apparent need for resources to conduct the program itself.

Concrete questions must be posed and answered regarding money, space, and staff needs so that significant innovation can be given respectability, visibility, and professional recognition. Continuous administrative support is necessary because longitudinal designs for evaluation take considerable time, staff morale, and commitment must be maintained over a long period and the control conditions must be maintained.

THE CHARGE

Jerome provides us with a final challenge:

> In the search for new modes of education we have sometimes satisfied our own demands for quality with a lick and a promise. We have known intuitively that we were in conscientious pursuit of excellence (as well as survival), but we have had too little serenity to take time to define even for ourselves what we mean. Shoddiness and shallowness often result. Working in the inappropriate formats of conventional institutions we get angry and frustrated and sometimes resort to slap-dash solutions. Now there is an emergency need for redefining the mission of these experiments – new terms, new dynamics, new measures . . . .[5]

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FACULTY CHARACTERISTICS AS RELATED TO TEACHING WORKLOAD: A HEURISTIC MODEL

James E. Prather and Glynton Smith
Georgia State University

INTRODUCTION

The major cost in an institution of higher education is faculty salaries; thus, an investigation into costs at a university or college must deal with an analysis of faculty activities. Romney[1] has provided a detailed summary of current problems and issues in measuring and evaluating these faculty efforts.

The debate concerning faculty teaching workloads has also been subject to review not only by the higher educational community but by governmental bodies and officials. Recently, several state legislatures have passed laws stipulating teaching workloads.[2]

The faculty productivity controversy has no easy solution, but it must be confronted to meet pressing financial and governmental demands. The basic issue is compounded by external academic parties, including accrediting associations, professional disciplinary standards, and special instructional techniques. Institutions have, to some extent, lost control to external agencies, whether governmental or academic.

THE PLAN OF STUDY

The aim of this study is to provide a heuristic framework of the relationships among faculty characteristics and faculty teaching efforts. A model is developed in this study which attempts to take into account various parameters that reflect upon faculty activity and output.[3]

This study uses as its base of analysis a university with a faculty of approximately 600. The findings from the analyses should suggest hypotheses and modes of analysis for other colleges and universities.

There exists a body of literature[4] which indicates the life style of professionals in higher education. The importance of discerning patterns of activity among faculty in the role of teaching is germane to the accountability issue. Hence, this study will attempt to deal with some of the factors in the higher educational environment that influence faculty teaching effort.

A number of influences have been suggested to be associated with the question of faculty activity. Several external influences are, for example, economic, demographic, cultural, public policy and labor market.[5] The heuristic model hypothesized in this study cannot deal with all of these questions. However, there are some indicators of these influences incorporated into the model.

The two types of variables in this study are measures of instructional workload, and personal, professional, and academic characteristics of the faculty. The teaching workload variables are: graduate courses taught; and credit hours and student credit hours taught (number of students times credit hours). The characteristics by category are: (a) personal: sex and minority groups; (b) professional: degree, salary, and length of service; and (c) academic: school and rank.

To analyze the data in this study a correlation matrix was calculated, as is shown in Table 1. In order to use the

TABLE 1
Correlation Matrix on Faculty Characteristic Variables
N = 584

	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Race (minority groups)													
2 Sex (Female)	.012												
3 Highest Degree	-.036	-.180**											
4 Years of Service	-.104*	-.014	.026										
5 Professional School	.052	.040	.126**	-.107*									
6 School of Commerce	[illegible]	-.284**	.008	-.047	-.276**								
7 School of Liberal Arts	[illegible]	.076	-.036	.197**	-.442**	-.620**							
8 School of Para-Med Sciences	.008	.332**	-.124**	-.153**	-.105*	-.147**	-.236**						
9 Faculty Rank	-.036	-.271**	.507**	.356**	.030	.053	-.009	-.148**					
10 Graduate Courses Taught	.113*	-.266**	.319**	-.037	.112*	.278**	-.233**	-.207**	.321**				
11 Salary	.001	-.399**	.506**	.123**	.049	.311**	-.261**	-.121**	.793**	.395**			
12 Credit Hours Taught	.026	.120**	-.088*	.036	.015	-.189**	.267**	-.271**	-.233**	-.132**	-.391**		
13 Student Hours Taught	-.048	-.014	-.051	.054	-.084	-.097*	.287**	-.318**	-.193**	-.221**	-.312**	.686**	

*P .05 **P .01

nominal variables of race, sex, and the four academic schools, each was given a dichotomous form.[6] The matrix of correlations has 50 significant correlations from the total of 78 correlations. With the large number of subjects used, many correlations were statistically significant but have little practical significance.[7] The correlations are the input data needed to analyze the model.

The mode of analysis is to interrelate the variables in such a way as to test the paradigm of faculty characteristics. The focal point of the paper is the model representing a dynamic portrayal of the relationship between teaching workload and faculty characteristics. The model is intended to serve as an information source for academic planning. It may also aid in the reevaluation of established goals and practices. Some of the current educational issues germane to this model are: (a) equal opportunity for women and minority groups; (b) salary as influenced by personal, professional and academic factors; and (c) the determinates of teaching workload.

THE MODEL

To have a more comprehensive overview of the association among the 13 variables, path analysis[8] was performed on a heuristic model. Path analysis enables one to test for the strongest association once a hypothesized set of relationships has been established. A path analysis provides a coefficient for each hypothesized relationship between variables. Thus, a model may be developed that includes those paths or directions of influence which are considered statistically significant.

The arrows or paths in the model indicate the direction of influence from one variable to another. The path coefficient associated with each variable expresses the relative degree of association. Four variables are considered to be

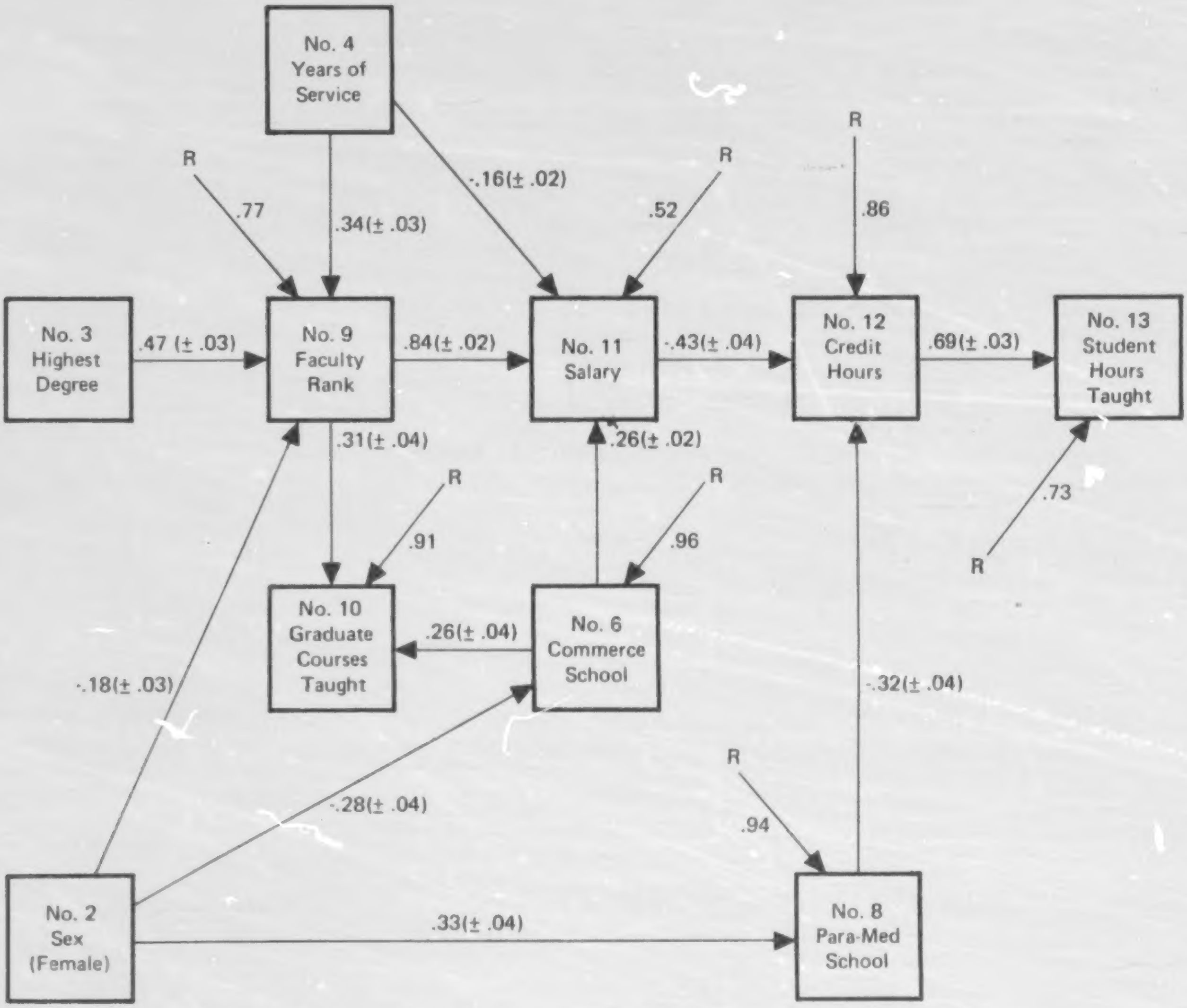
No. 4
Years of
Service
R
.77
.34(± .03)
-.16(± .02)
R
.52
R
.86
No. 3
Highest
Degree
.47 (± .03)
No. 9
Faculty
Rank
.84(± .02)
No. 11
Salary
-.43(± .04)
No. 12
Credit
Hours
.69(± .03)
No. 13
Student
Hours
Taught
.31(± .04)
.26(± .02)
R
.91
R
.96
.73
R
No. 10
Graduate
Courses
Taught
.26(± .04)
No. 6
Commerce
School
-.18(± .03)
-.32(± .04)
R
.94
-.28(± .04)
No. 2
Sex
(Female)
.33(± .04)
No. 8
Para-Med
School

Figure 1: Heuristic Model: Faculty Characteristics

exogenous or predetermined: race, sex, highest degree and years of service. All other variables are considered endogenous or produced from within. A variable having an arrow going to it also has a residual path, indicated by the R and the associated coefficient. The residual path, or the disturbance, as it is sometimes labeled, indicates the variance not explained by the other variables in the model.

The initial testing for the path analysis was by ordering the directions of influence from professional to academic to teaching workload. In order to keep the model from becoming overly complex, we have retained only those paths considered to be significant. When the ratio of the path coefficient to its standard error had a probability of less than one in a thousand, it was deemed significant. With the large number of cases, it was felt that only paths of approximately .15 or greater had practical statistical significance.

The results of testing the model are shown in Figure 1. The three variables dropped from the model because of their low association with other variables included race, professional school, and school of liberal arts.

The model of faculty attributes shows a number of salient findings:

1. Faculty rank is positively associated with highest degree and years of service; it is negatively related with being a woman;
2. Female sex is positively associated with teaching in the paramedical school and negatively associated with teaching in the school of commerce and holding high faculty rank;
3. Graduate teaching is positively related with faculty rank and teaching in the school of commerce;
4. Salary is positively associated with faculty rank and school of commerce;
5. Credit hours taught is negatively associated with salary and teaching in the paramedical school;
6. Student hours taught is to a large degree merely a function of credit hours taught.

The model should not be considered as a complete statement of the dynamics of faculty characteristics and workload. Nevertheless, it does give an indication of the present level of relationships among the variables. The incomplete nature of the model is indicated by the residual paths which range from a low of .52 to a high of .96. The higher the residual path coefficient is, the lower the degree that the variable is predetermined or associated with the other variables.

SUMMARY AND IMPLICATIONS

The critical factors in the model are faculty rank and the commerce school. As is well known, the cost of graduate instruction is substantially over that of undergraduate instruction. Thus, this model shows that the commerce school is associated both with salary and number of graduate courses taught. Faculty rank is also associated with salary and graduate courses taught. The model shows the progressive relationship of higher degree to faculty rank – the higher the faculty rank, the higher the salary and the less the credit hours taught. Another factor involved in the lowering of credit hours taught is the instructional techniques in the paramedical school.

The general discussions of sex[9] underline the need to determine if any discernible patterns of unequal treatment of women faculty members exist. The model shows that women at this institution have lower faculty rank, are infrequently in the commerce school, and are most likely to be in the paramedical school. However, in light of faculty rank being substantially associated with degree level (r = .51), women hold fewer advanced degrees (r = -.18). The low number of women in the commerce school and the high proportion found in the paramedical school reflect nationwide trends in these disciplines.[10]

Another interesting observation is the negative association between the years of service and salary. This appears to be an illustration of the phenomenon of "buying new faculty."

In summary, the key point of the model is indicated by factors that are outside the administration's control. For instance, workload is established by the American Association of Collegiate Schools of Business for the commerce school and the paramedical school must also meet accreditation standards. Faculty rank is so closely associated with salary that costs here leave little room for flexibility. The one possible area that might be subject to change would be to increase the student credit hours by a policy to increase average class size. Unit cost per student would thereby be reduced. The model gives little indication that flexibility in credit hours taught could be achieved without a radical change in the academic conventions and standards.

The model analysis is, of course, at best an unrefined formulation of how the faculty interact with the institutional structures. However, we still feel that when the findings of the analysis are combined with the experience and wisdom of the administration a synergistic profile of this university will result.

This is a case study of one institution; however, in our opinion, the same approach might be meaningful to other institutions of higher education for discovering general patterns of influence. We feel that faculty activities in relationship to pressing issues of accountability, rising costs, and social inequities make this report of timely concern. The present "credibility gap" between institutions of higher education and their public and private benefactors warrants consideration of the factors outlined in this paper.

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A PLANNING MODEL FOR THE COMMUNITY COLLEGE

John A. Lucas
William Rainey Harper College

In this age of accountability and crisis of funding, moving the institution to change in the desired direction requires good long range planning. This paper is dedicated to aiding the institutions in the planning process. Reviewed are the Long Range Plan developed at William Rainey Harper College.

Planning, to be a rational process, must necessarily be comprehensive so that all possible costs, benefits, and other effects are considered for each action proposed. On the other hand there is a limit to the cognitive development of any plan. The planning process will be different for static than for dynamic organizations.

In the planning process, traditionally the mission, goals, and objectives of the organization are first determined. It is important that involvement of members in the organization are secured at this step and in future steps. The process next calls for exploration of various alternatives to implement objectives. Following this, research is carried out on costs and effects and then evaluation and priority setting take place. A time schedule of events is designed within the framework of available resources and proposed to the organization. Feedback is received, modifications made and the plan carried out. Finally, a monitoring process is set up to review and evaluate progress and to update the plan.

At Harper the planning process began with a firm commitment by its president in the summer of 1970. After an elaborate selection process, consisting of evaluation application forms and personnel interviews, a committee was formed with the Director of Planning and Development as chairman and the remaining membership composed of three other administrators, five faculty and one student. The committee was charged to explore the areas of defining the community and students served, the type and mix of services to be offered, the innovations to be undertaken, physical facilities needed and the financial structure required. A first draft of such a plan was to be submitted to the president no later than September 1, 1971.

The committee's first task was to go out into the organization and do some brainstorming. The result of this exercise was a decision matrix which listed all the alternatives to be considered vertically and the criteria by which these alternatives were to be evaluated horizontally. This decision matrix then became the outline for the rest of the long range planning process. Using this guideline, the committee then identified the research to be undertaken that would provide the information required in the decision matrix to evaluate the alternatives. Research areas which were identified included surveys of the student body, the faculty, the administration and the community. In addition, areas for cost analysis were pinpointed along with topics to be researched in the literature. Particular emphasis was given to the Carnegie Commission Reports and the State Master Plan. A consulting firm carried out population projections for the college district and from these enrollment projections were derived. Using these enrollment projections, a long range financial plan was prepared by the business office. Research reports on current students, students who withdrew and alumni were already available. Legal matters were researched as needed. Upon completion of the research activity, the committee met in the summer for one week to evaluate the results.

The evaluation of the alternatives was a subjective process in which members of the committee judged how well each alternative satisfied the criteria agreed upon in the decision matrix. These criteria ranged from financial implications to educational impact, as determined in the professional literature, to opinions of various internal and external groups, to state and national priorities and to legal considerations. As a result of these meetings, recommendations were made concerning physical expansion, district expansion, financial planning, governance, accountability, academic scheduling and calendars, utilization of faculty resources, program mix and breadth, innovation, grading and retention and internal services. Some of the recommendations were specific courses of actions to be accomplished by a certain date while other recommendations were feasibility studies to be completed by a certain date. Finally, the Long Range Plan calls for a system that would monitor progress made on the plan and yearly input of new information and recommendations. In this way the plan would never be out of date. Hearings within the institution were held during that week, and the feedback was evaluated by the committee.

Several drafts of the plan were written and distributed to all segments of the institution, and, as a result of a series of hearings and written comments, modifications, clarifications and additions were incorporated into the draft submitted to the Board of Trustees. The Board suggested some new guidelines, some modifications, some new directions that should be explored and called for more back-up data in specific areas. More important, they suggested a blue-ribbon citizens' committee be appointed and review the plan before it was re-submitted to the Board again. After the citizens' review, new drafts were prepared based upon their comments and suggestions. The Board reviewed this later draft which they formally adopted. Concurrently, a new committee was formed to continually monitor and update the plan.

The recommendations adopted in the Long Range Plan could be classified as follows:

1. Immediate action (actions actually carried out while the plan was being developed), new retention system, new temporary calendar, creation of a new position which is solely accountable for innovation at the college, establishment of an accountability committee, and initiation of a general studies program;
2. Future new action – purchase a new campus site, include student input in faculty evaluation, add honors emphasis to learning laboratory, establish credit by examination, broaden development work in career program area, leadership center, in-service

training programs, and a new professional to perform accountabilities studies;

3. Future expansion – specific enrollment levels desired in specific programs;
4. Contingency goals – financial plan priorities if deficit occurs, expansion or protective action if annexation threatens, and new programs to be based on demand;
5. Feasibility and other studies ordered along with necessary resources required – cultural center, governance evaluation, faculty load package, permanent academic schedule, grading policy, needs of Spanish speaking population, physical facility specifically designed for adult education, and computer center priorities for systems development.

As a result of going through the planning process and examining the plans of other institutions of higher education, the following key elements of good planning were identified.

1. Assignment of full accountability for development of the plan to the chairman.
2. Careful selection of the planning team
   a. Their influence in the organization
   b. Ability to work with others
   c. Ability to see what is best for the institution as a whole
   d. Creativity.
3. Comprehensive planning interrelating program and service planning and policy formulation along with the traditional financial and facilities planning.
4. Exploration of a wide variety of alternatives to insure the most creative plan.
5. Statement of some goals and recommendations in contingency fashion so that the relationship between changes in the external environment and the anticipated operation can be seen.
6. Involvement and input from all parts of the organization, including top management, in order to increase the plan implemented.
7. Assignment of accountability mechanisms for the implementation of the Long Range Plan.
   a. Tie in the goals and recommendations with a management system, such as Management by Objectives.
   b. Establish a time frame for carrying out the objectives and recommendations.
   c. Establish an ongoing mechanism to periodically monitor, review and update the plan.
8. Determination and assignment of resources needed for each action for feasibility study proposed.

After going through the long range planning process at Harper some of the advantages that have been realized are as follows:

1. Stimulates actions as a result of and during the process of planning;
2. Provides rationale to the state, the board, the faculty, students and other members of the organization for action taken;
3. Provides rationale for resource allocation to projects undertaken;
4. Provides on-going mechanism for initiating new programs and providing needed resources;
5. Builds in accountability measures for new programs and services proposed.

Similarly, certain reservations and doubts are raised as a result of going through the process.

1. Tremendous effort and involvement required by an institution to carry on long range planning.
2. Initially, time frames for decision making are lengthened.
3. There is a real problem in motivating people to consider creative alternative modes of action. The planning process can be such an overwhelming task that people fixate on completing the task in the least complicated manner, which means following traditional patterns of action.
4. Classically, one starts in the planning process with the mission statement, goals and objectives and then moves to developing alternatives to fulfill the mission and goals and objectives. However, in practice there is an interaction between the process itself and the starting point. The principal reason for this is that it is very difficult to develop a realistic and rational mission statement and set of goals and objectives in the abstract.

In summary, a huge effort and a high degree of involvement is required by an institution engaging in meaningful long range planning, even though the process is simple in concept. The process does bring about certain benefits to the institution, and the process itself will more and more be required by various governmental and regulatory agencies.

REVISION OF THE ONTARIO OPERATING GRANTS FORMULA

R. N. McDougall
Council of Ontario Universities

The method of distributing operating funds from government to a number of universities in an equitable manner poses a familiar problem, but one to which there is no obvious solution. Since 1967-68 the provincial government of Ontario has divided operating funds among the fourteen universities in the province according to a formula. After several years of operation this formula is now being questioned. The issues of this formula review and a proposed method for setting new formula weights are the topic of this paper.

Briefly, the existing formula is based on full-time equivalent enrollment in a degree programme category. The FTE enrollment in a category is multiplied by the weight for that category to derive what are known as 'Basic Income Units'. The grant for each university is equal to the total number of Basic Income Units for that university times a fixed dollar value per BIU ($1765 in 1972-73) less the standard tuition fees which the students pay. Programme category weights were originally based roughly on a one-time cost study done at one Ontario university. For example, the general arts programme has a weight of 1.0 and other programmes have weights relative to general arts, ranging up to a maximum of 6.0 for a Ph.D. student.

The principles on which the original formula was based underlie the whole review of the formula, since it is strongly felt that they should be maintained:

(1) the formula is a grants formula and should not be used for internal budgeting within a university;
(2) the formula should be kept simple;
(3) it should reflect roughly the cost of programmes, but with no exact relationships;
(4) it should guard against producing serious distortions in the income of one university from year to year.

As originally designed, the formula was intended to give universities an incentive for effective management. But, being a 'broad brush' formula, there are no sanctions in the formula which guarantee effectiveness or efficiency. Accountability to government cannot and should not be accomplished through the formula but rather by financial reporting mechanisms.

Why was there pressure for a review of the formula? It is true that it has worked reasonably successfully in the last four years. But there have been many small *ad hoc* changes. Weights had to be increased for medical students and interns. New programmes have been started which have no weighting category in the original formula. Many requests for changes in individual programme weights have come from the universities.

Because it is based exclusively on enrollment, the formula is a growth formula. Is the same formula relevant in a period when student enrollments are beginning to level off? In addition, it was originally stated that a periodic review of the formula should be undertaken with the hope that there would be better cost information available to aid in the determination of weights.

The review was started ten months ago by a joint university-government committee, and began with meetings with university representatives to define issues and to obtain feedback on the present formula operation. At present, the review has been temporarily suspended because of a parallel development in Ontario which will have a strong influence on the future of the university system. A government commission set up to examine post-secondary education in the province has produced a Draft Report of its recommendations, including a number on the general method of financing universities. In particular, the commission recommends the separation of instruction and research for funding purposes, that a higher portion of the cost should be borne by the students, and that a 3-year grant system should be adopted in order to facilitate planning. Until reaction to these recommendations and their implications becomes clearer, the formula review has been stopped. Therefore, although the issues of the review outlined in this paper have been raised and discussed in Ontario, no procedure for dealing with them has been adopted.

ISSUES OF FORMULA REVIEW

1. The Role of Cost Studies

If it is considered appropriate that the weights of a programme-related formula should represent approximate measures of the relative costs of the programmes, it would only seem logical that the development of a programme costing system would provide an ideal means for arriving at a set of weights or for justifying existing weights. However, the state-of-the-art of programme costing in Ontario dictates that no programme cost information will be available in the near future. Programme costing is in its infancy in Ontario, with some work being done at individual universities and an investigation into a larger study being undertaken by a province-wide group of university finance officers. These studies are aimed at producing cost information for internal management decision-making and not for justifying funds from external sources.

There are ways of using the cost information that does exist without disclosing details of the cost data and in spite of the lack of a uniform system-wide programme costing system. One such method will be described below.

The premise implicit in the present formula is that costs of similar activities or programmes do vary from university to university and such variances are to be expected. A programme cost exercise would undoubtedly indicate these differences, but if the formula is to adhere to one of its basic premises, it can only fund roughly on the basis of cost and not exactly. In addition, historical costs may be irrelevant and misleading for funding the future.

2. Scale and the Linearity of Costs

The type of programme alone does not determine relative cost. Scale of operation and the mix of programmes at a university are important cost factors. This is obvious in Ontario where there are large institutions offering a wide variety of instructional programmes in social sciences, humanities, sciences, and the professions, and with large graduate and research programmes, as well as small universities giving primarily undergraduate arts and science instruction. In one instance the province of Ontario has recognized these cost factors by giving extra funds to those universities which have not reached viable enrollment levels.

A number of university costs are fixed, at least in the short run. Other costs may vary in relation to the numbers of students, but not necessarily in direct proportion. As student population grows, there is an increased demand for a larger variety of courses. This necessitates the addition of extra teaching faculty which in turn may tend to proliferate the number of courses offered. Some costs remain constant for small increases in student numbers, but would move in a step function with larger increases.

If this is how costs operate, should a formula try to incorporate all of these factors giving rise to cost change, or is the assumption that costs vary according to the numbers and types of students a reasonable approximation to the way in which costs really move? If not, it may be advisable to change to an alternative basis for funding.

3. Alternative Bases for Funding

Using student numbers as the basis for funding has the distinct advantage over other bases of being a broad approach to the funding problem. A formula on this basis does not require tremendously detailed data, it is simple to understand, and it allows universities a great deal of flexibility in their internal budgeting.

One alternative would be student contact hours. These would provide a better approximation of teaching costs than student numbers, because, when combined with class size information, they indicate a need for teaching faculty. However, a formula system operating on this basis would require a massive data collection and would provide for more accuracy in teaching costs only. It would also create pressure to move towards an internal budgeting formula rather than a grants formula.

Student enrollment by year or level might reflect costs slightly more accurately, although it would make the assigning of weights even more difficult. With the trend towards the elimination of specific years in a programme and an increase in part-time enrolment, such a system would encounter many problems for implementation.

Another alternative is to fund on the basis of output. This is perhaps an ideal 'economist's' approach to funding, but at this point in time it would prove impossible to use. In the first place, there are no specific definitions of university output, let alone ways of measuring them. In addition, the approach neglects the process of producing the output.

In general, it appears that the student enrollment by programme basis has advantages, primarily that of keeping government control over university operation and information to a minimum.

4. Extra-Formula Funds

Since 1967-68, university operating funds coming from the provincial government have been split into formula and extra-formula portions. The latter funds have been provided to universities that have not achieved a minimum level of enrollment for formula funding, for support of major new programmes at various universities, and for special needs such as bilingual and trimester operations.

These funds, handed out at the government's discretion, have been declining recently, and the main issue for formula review is whether these special needs can be incorporated into the formula or whether extra-formula support is still needed. It would seem reasonable, for example, that costs of bilingualism are on-going costs which could simply be reflected in a higher weighting within the formula for a bilingual programme. But it is more difficult to attempt to include funds for innovation within a formula.

Provision of extra-formula funds for quality programmes poses even further problems. The quality of a programme is very much a function of the quality of the resources which are input to the programme. It is therefore conceivable that extra-formula funds could be provided specifically for maintenance of a high quality programme. However, such a plan would require the assessment of quality by an impartial outside agency, something which would be difficult to find. This is apparently done in Great Britain by the University Grants Commission. Special funds for quality would also discriminate against newer universities which would only be able to build up quality programmes over a long period of time.

5. Separation of Certain Functions from the Formula

Under the present formula, all operating programmes of the universities are funded, although not all of these activities are directly tied to instructional programmes, *e.g.*, library, computer, research overhead. It has been suggested that expenditures for these activities should be removed from the formula and funded by other means, either extra-formula or by a different formula. The argument for this approach is that it would enable revenue to be more closely related to need.

Funding completely outside of the formula would be a step backward toward a budget review basis for funding. Alternatively, if these activities were funded by a separate formula as is done in many American jurisdictions, it is a move towards a more complex formula, and one requiring a much greater administrative effort. No matter how the funds for functions other than instruction are generated, the suggestion means much less internal budgeting flexibility for an institution.

A number of other smaller issues were raised during the early stages of the review. Should trimester operations receive a special treatment within the formula? Should fees continue to be subtracted from BIU-generated income to obtain grants? Should the number of programme categories be reduced so that the formula becomes even broader?

It is obvious that all of these issues are simply not capable of a short-run solution. However, the following method is one that might be used in the short-run to assign programme weights.

THE DELPHI TECHNIQUE

The Delphi technique is a method of using informed judgment in a structured manner to derive a consensus opinion on questions to which there is no accurate answer. It was developed at RAND Corporation in California and has been gaining widespread acceptance by business and government in trying to answer difficult questions. For example, it has been used with apparent success in the prediction of the timing of future technological developments. Most uses have been in the setting of goals and priorities.

The technique calls for an initial round of questioning by questionnaire of 'experts' – those persons most concerned with the unknown information. Answers to this first round would be accompanied by brief supporting explanations. Responses would be tabulated and the experts would be requestioned after being supplied by the investigator with feedback derived from the first round of questioning. The process of requestioning is designed to eliminate misinterpretation of questions and to bring to light any knowledge available to one or a few members of the group and not to all of them. Additional rounds of questioning would narrow in on a consensus opinion as the second and third round answers would be based on additional information.

How might such a procedure help in formula review? Let us assume in the short-run that the formula would remain a student-based formula by programme. The Delphi technique could then be used to assign programme weights once a programme structure had been adopted. The designated experts in this case should probably include vice-presidents (academic and administrative), deans, senior finance officers, institutional research officers, and registrars from the 14 universities, as well as government financial and academic planning officers. In the province of Ontario, this might imply about 250-300 persons. The questionnaire would consist of a list of the programme categories. A weight of 1.0 would be established as the weight to be assigned to the general arts programme. The experts would then be asked to assign weights to the other programme categories in relation to the general arts weight. At those universities where specific cost data was available or cost studies by programme had been undertaken, this information could be used to support the answer. In other cases, answers would tend to reflect the general experience of the respondent. No limit would be placed on the range of weights.

The first set of responses might indicate for example that a weight for undergraduate engineering was in the range 1.6 to 4.0 with most responses in the 2.5 to 3.0 range. Information on the distribution of the responses, such as range and percentiles, would be supplied to the experts. The second response might show that the range of undergraduate engineering weights had narrowed to 2.4 – 3.2. A consensus opinion could be reached by successive iterations.

The Delphi technique has a number of distinct advantages for setting programme weights. There is a sharing of responsibility among all respondents. If weights were set only by government, by administrators, or on the basis of a cost study from a single institution, other universities could legitimately charge that they were not represented. Delphi allows respondents to remain anonymous. In this way, no one dominant person can control the results and no one can feel that his viewpoint was not represented. The Delphi technique has proved most useful in cases where there was no way of immediately confirming the results. Unless great strides are taken in programme costing and in the degree of disclosure of cost information, there will be no way of confirming programme weights. In fact, even programme costs could not give you a more accurate weight.

Delphi does have drawbacks. The procedure may produce weights which could radically change the existing pattern of funding, and therefore such weights would have to be phased in over a period of time. It necessitates the questionnaire approach with all the inherent difficulties of questionnaire design and lack of response.

However, more than any other existing approach, the Delphi technique is a method of gaining a consensus, something which is difficult in university-government relations. Whether it will be used or not in the Ontario formula review, its value as an aid to the thinking process indicates that the Delphi technique merits thorough consideration by universities in problems of this type in the future.

STATISTICAL INTERFACE SYSTEM

Norman P. Uhl
North Carolina Central University

The Statistical Interface System (SIS) is a product of the National Laboratory for Higher Education and was developed by Norman P. Uhl (consultant to NLHE) with the assistance of Thomas S. Briley (NLHE Research Associate) and Anne S. Miller (former NLHE Systems Analyst.) The SIS has been designed for the purpose of applying statistical analysis tools to common institutional research problems, although it may be applied to other areas of research. The lack of programming skills on the part of many institutional researchers and the variety and complexity of "canned" programs have been barriers to the use of computers for data analysis. The SIS does not require any on-site hardware (keypunch, computer) and can be used by individuals with a minimum of training in statistical analysis. It is to serve three functions:

1. To assist in the selection of an appropriate analysis technique;
2. To translate the information given by the user on simple forms into procedures which operate and control the analysis programs;
3. To assist the user in interpreting the results of the analysis.

To accomplish these functions, the SIS is divided into three sections. The first section, the Design Selection Guide, describes a procedure for selecting an appropriate analysis for a variety of institutional research problems. It first defines the terms employed at each decision point and then through the use of a decision logic table provides a method for selecting an appropriate analysis. Each analysis is briefly described and, except for the most simple analyses, an application is provided. The second section (the Data Processing Guide) provides a description of each analysis as well as instructions for providing the necessary information to the computer for processing the data by any of the analyses selected in the first section. The provision of data and analysis specification is accomplished through the use of four standard forms which are useable in all analyses. Also in this section are instructions for executing the SIS program, including keypunching and job control instructions. This may be done on site or at a remote location. The third and final section is a guide to explain the computer printouts from each of the above statistical analyses for persons not familiar with the output of the programs employed or who may need assistance in interpreting the output. Examples of the application of the SIS to institutional research problems are given throughout.

The Statistical Interface System makes use of the biomedical computer programs developed at the University of California as well as Cramer's multivariate analysis of variance (MANOVA) program. The biomedical computer programs were selected because they are available at more computer centers than any other statistical package. However, one shortcoming of this package is the unavailability of a multivariate analysis of variance and covariance program that will handle factorial designs with unequal sample sizes. Cramer's MANOVA satisfies this need and has therefore been included in the SIS.

To illustrate the operations of the SIS, the following sample problem is presented.

The Dean of Undergraduate Studies has observed that a few sophomore students with rural backgrounds are performing more poorly than students from more populated areas. He would like to have a study conducted to investigate whether there is any difference in the grades of student completing the first two years who come from primarily rural areas and those coming from primarily urban areas, since any difference may have some implications for admissions policy. He asks the Office of Institutional Research to investigate this.

Since students who drop out before completing the second year will not be included in this analysis (a separate drop-out study has already been performed), the institutional researcher decides that, if possible, it would be desirable to include all four semester grade point averages rather than any single semester or composite grade point average.

The institutional researcher may use the decision logic table included in the Design Selection Guide to select an appropriate statistical analysis for this problem. In addition to the decision logic table, the Design Selection Guide defines the terms employed at each decision point and provides examples from institutional research.

The first question to be considered in using the decision logic table is the purpose of the analysis. Is the purpose to compare two or more samples, relate two or more variables, or describe a sample, group, or variable? Since the purpose is to compare students from rural and urban backgrounds, the response would be to compare two or more samples. The section of the decision logic table that compares two or more samples is presented in Figure 1. According to Figure 1, the next decision to be made is whether the samples are independent or related. Since the students are drawn from two different population groups (rural and urban), they are independent samples and this decision leads to the upper half of the table. Are one or more control variables included? The researcher did not include any control variables. Is (Are) the independent variable(s) continuous, discrete, or both? There is only one independent variable having two distinct categories, rural and urban. Therefore the independent variable is discrete. Are the number of dependent variables one, or two, or more? There are four dependent variables – the four grade point averages for each semester during the first two years. Are the dependent variables continuous or discrete? Since the grade point average can be any value between 0 and 4, it is continuous in this range.

The answers given to each column in Figure 1 lead to the column suggesting an appropriate analysis. In this column, the path of our answers has led to the block which states

The purpose of the analysis is to	and the samples are	and one or more control variables are	and the independent variable(s) is (are)	and the number of dependent variables are	and the dependent variable(s) is (are)	THEN an appropriate analysis will be	For a description of the analysis and instructions for coding the analysis, GO TO PAGE
Compare two or more samples	independent	included	continuous[1] and discrete				
			continuous[1]				
			discrete	2 or more	continuous	Multivariate analysis of variance of covariance[5]	41 of 43
		not included		One	continuous	Univariate analysis of variance or covariance[4]	37 or 39
			continuous		discrete	Chi Square or Discriminant Analysis[3]	26 or 32
				2 or more[2]			
			continuous and discrete	one	discrete	Discriminant Analysis	32
	related	included or not included	continuous and discrete[1]				
			continuous[1]				
			discrete	one	continuous	Repeated measures design using multivariate analysis of variance or covariance[5]	45
				2 or more[2]			

[1] Change continuous variable(s) to discrete variables; then select appropriate block in this step.

[2] Analyze each dependent variable separately; with this additional information, select the appropriate block in this step.

[3] If one independent variable convert it to a discrete variable and use Chi Square; if more than one independent variable, use discriminant analysis.

[4] If a control variable is included, use analysis of covariance; otherwise use analysis of variance.

[5] If a control variable is included, use multivariate analysis of covariance; otherwise use multivariate analysis of variance.

Figure 1: Decision Logic Table Section for Comparing Two or More Samples.

"multivariate analysis of variance or covariance" with the footnote to use multivariate analysis of covariance if one or more control variables are included. Since no control variables are included, multivariate analysis of variance is suggested as an appropriate analysis.

The next column gives the page number in the Data Processing Guide where one may find a detailed description of the selected analysis, including outputs and limitations, and any special instructions for completing the forms for coding this analysis. Also presented in the Data Processing Guide are the general instructions for completing the four standard forms. Figures 2-4 illustrate the completed forms for the above example. They are based on the following information.

The desired data is already punched on cards along with other information not needed in this analysis. The deck of cards contains seven cards per student. The variables of interest and their locations are as follows.

1. Student identification number. This is a six-digit number located in columns 2 to 7 of card 1.
2. Population of home town. This variable has been classified into three categories: urban (coded 1), rural (coded 2), and a third category for foreign students (coded 3). Students in this third category are not to be included in the analysis. The variable is located in column 80 to the third card.
3. Semester grade point average, a three-digit number ranging from 0 to 4 with 2 decimal places. The location of each semester grade point average is as follows:

1st semester	card 7	column 14-16
2nd semester	card 7	columns 17-19
3rd semester	card 7	columns 20-22
4th semester	card 7	columns 23-25

The completed forms are shown in Figures 2-4.

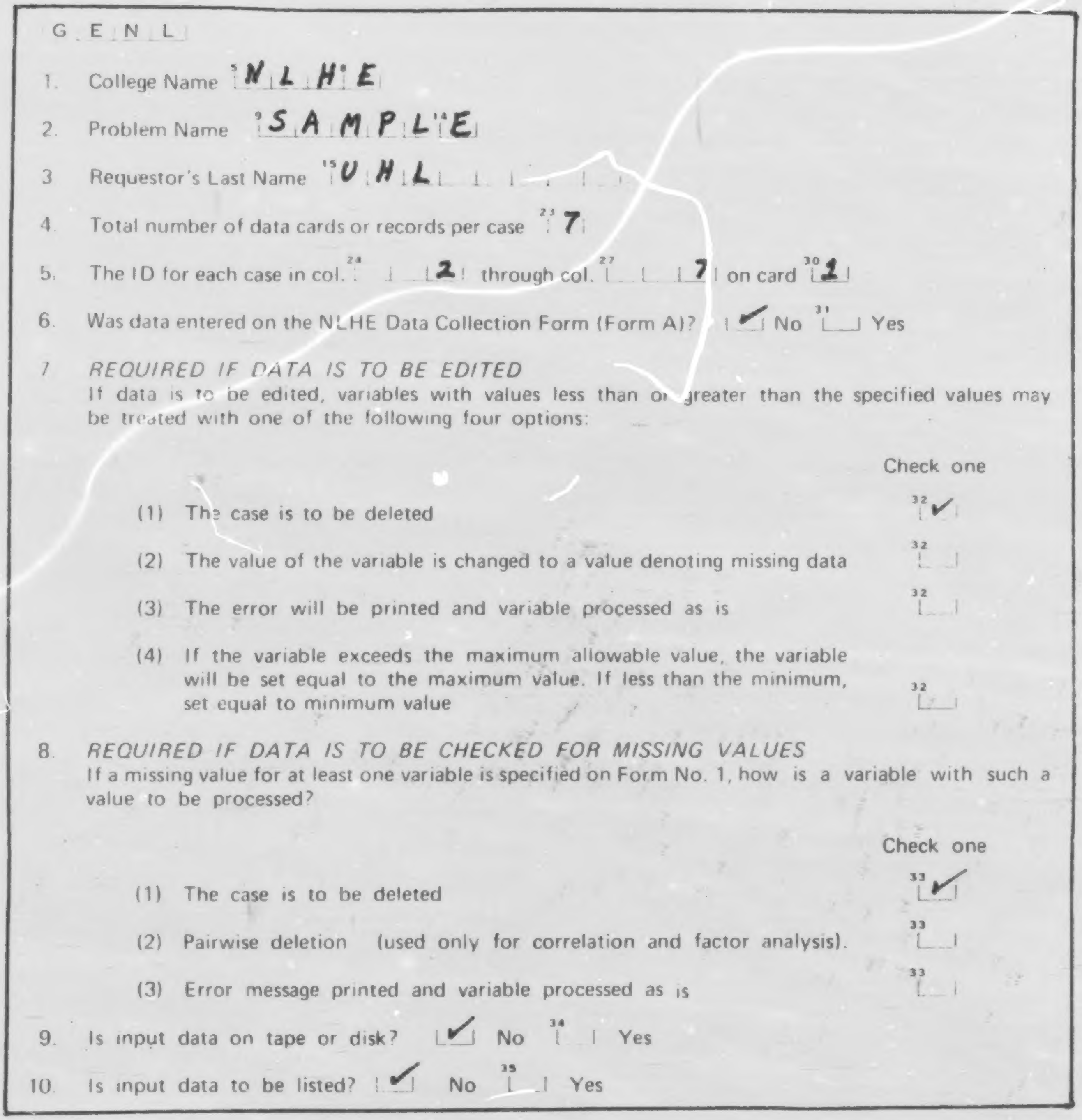
Note that is was desired to edit each variable. The minimum and maximum values for variables 2 through 5 are indicated in Figure 2 (Form 1) and the chosen edit option (the case is to be deleted) is checked as indicated in Figure 3 (Form 2). In this example, any student will be eliminated

1	2	3	4
D	S	C	R

		DATA FORMAT^{1,2}				EDIT VALUES^{2}		
Variable Number	Variable Name	Card No.	Beginning Column	Ending Column	No. of Dec. Plac.	Maximum Value	Minimum Value	Missing Value
5	7	15	16	19	22	23	28	33
01	POPULTN	3	80	80	0			0
02	SEM1GPA	7	14	16	2	4	0	B
03	SEM2GPA	7	17	19	2	4	0	B
04	SEM3GPA	7	20	22	2	4	0	B
05	SEM4GPA	7	23	25	2	4	0	B

1. Omit Data Format section if NLHE Data Collection Form (Form A) is used.
2. Omit for new (created) variables

Figure 2: Form 1, Data Description.



G E N L

1. College Name ^{5} N L H E
2. Problem Name ^{9} S A M P L E
3. Requestor's Last Name ^{15} U H L
4. Total number of data cards or records per case ^{23} 7
5. The ID for each case in col. ^{24} 2 through col. ^{27} 7 on card ^{30} 1
6. Was data entered on the NLHE Data Collection Form (Form A)? ☑ No ^{31} ☐ Yes
7. *REQUIRED IF DATA IS TO BE EDITED*
   If data is to be edited, variables with values less than or greater than the specified values may be treated with one of the following four options:

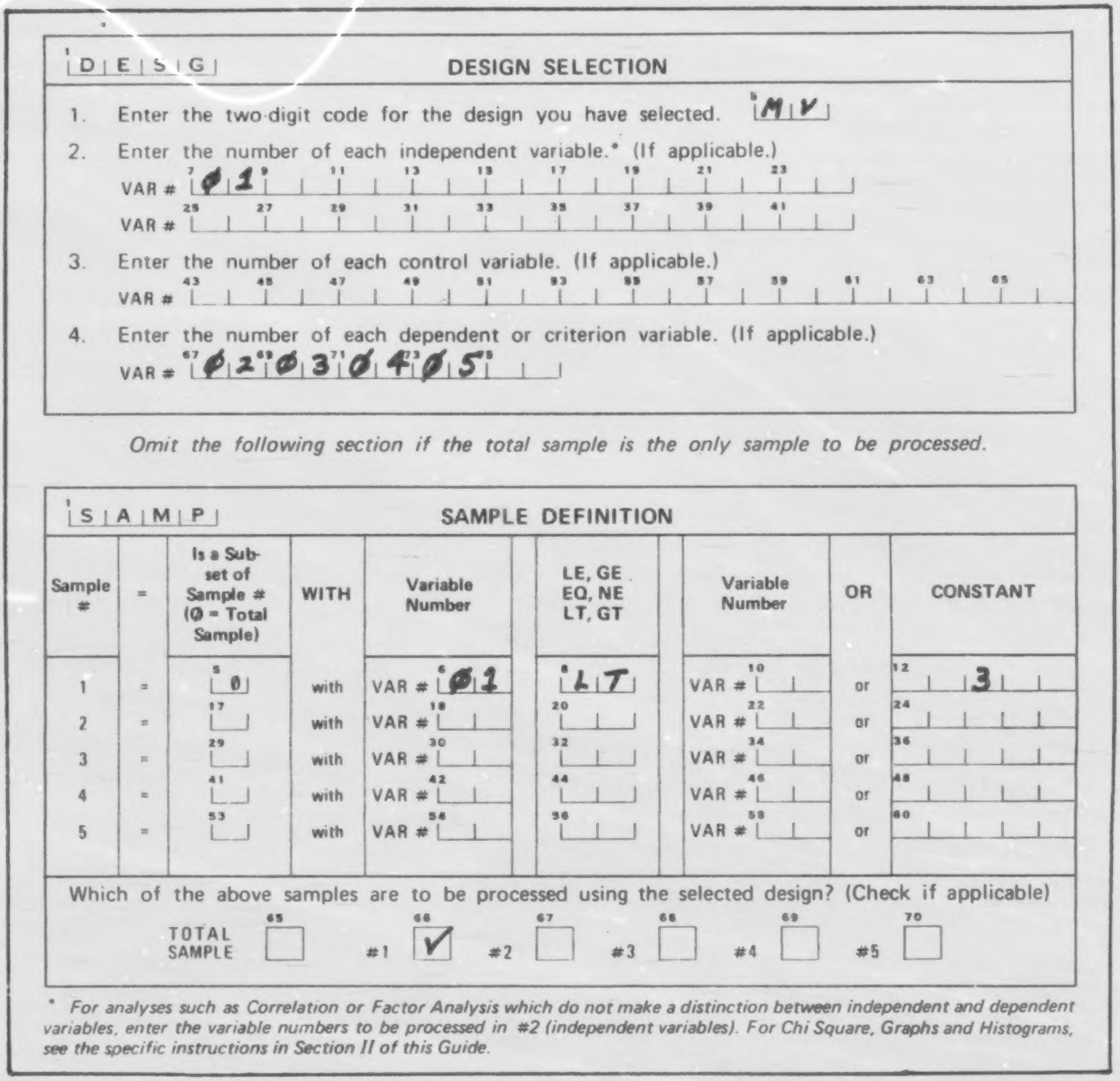
		Check one
(1)	The case is to be deleted	^{32} ☑
(2)	The value of the variable is changed to a value denoting missing data	^{32} ☐
(3)	The error will be printed and variable processed as is	^{32} ☐
(4)	If the variable exceeds the maximum allowable value, the variable will be set equal to the maximum value. If less than the minimum, set equal to minimum value	^{32} ☐

8. *REQUIRED IF DATA IS TO BE CHECKED FOR MISSING VALUES*
   If a missing value for at least one variable is specified on Form No. 1, how is a variable with such a value to be processed?

		Check one
(1)	The case is to be deleted	^{33} ☑
(2)	Pairwise deletion (used only for correlation and factor analysis).	^{33} ☐
(3)	Error message printed and variable processed as is	^{33} ☐

9. Is input data on tape or disk? ☑ No ^{34} ☐ Yes
10. Is input data to be listed? ☑ No ^{35} ☐ Yes

Figure 3: Form 2, General Information.



D E S G — DESIGN SELECTION

1. Enter the two-digit code for the design you have selected. M V
2. Enter the number of each independent variable.* (If applicable.)

VAR # 0 1

VAR #

3. Enter the number of each control variable. (If applicable.)

VAR #

4. Enter the number of each dependent or criterion variable. (If applicable.)

VAR # 0 2 0 3 0 4 0 5

Omit the following section if the total sample is the only sample to be processed.

S A M P — SAMPLE DEFINITION

Sample #	=	Is a Subset of Sample # (0 = Total Sample)	WITH	Variable Number	LE, GE EQ, NE LT, GT	Variable Number	OR	CONSTANT
1	=	0	with	VAR # 01	LT	VAR #	or	3
2	=		with	VAR #		VAR #	or	
3	=		with	VAR #		VAR #	or	
4	=		with	VAR #		VAR #	or	
5	=		with	VAR #		VAR #	or	

Which of the above samples are to be processed using the selected design? (Check if applicable)

TOTAL SAMPLE ☐ #1 ☑ #2 ☐ #3 ☐ #4 ☐ #5 ☐

* *For analyses such as Correlation or Factor Analysis which do not make a distinction between independent and dependent variables, enter the variable numbers to be processed in #2 (independent variables). For Chi Square, Graphs and Histograms, see the specific instructions in Section II of this Guide.*

Figure 4: Form 4, Design and Sample Selection.

from the analysis if a value is punched for variables 2 through 5 which is not within the acceptable range (0–4). Also all variables are checked for missing values and, according to Form 2, any student with a missing value for any of the variables will be eliminated from the analysis. Notice on Form 1 that the missing value for variable 1 is zero while for the remaining variables it is a "B." A "B" means that a blank is the only possible missing value. A zero means that both a blank and a zero punch should be considered as a missing value. Since a student could receive all F's in a semester, it is possible that a zero could be a valid datum; thus a "B" would be used rather than a zero whenever it is desirable to distinguish between a blank and a zero.

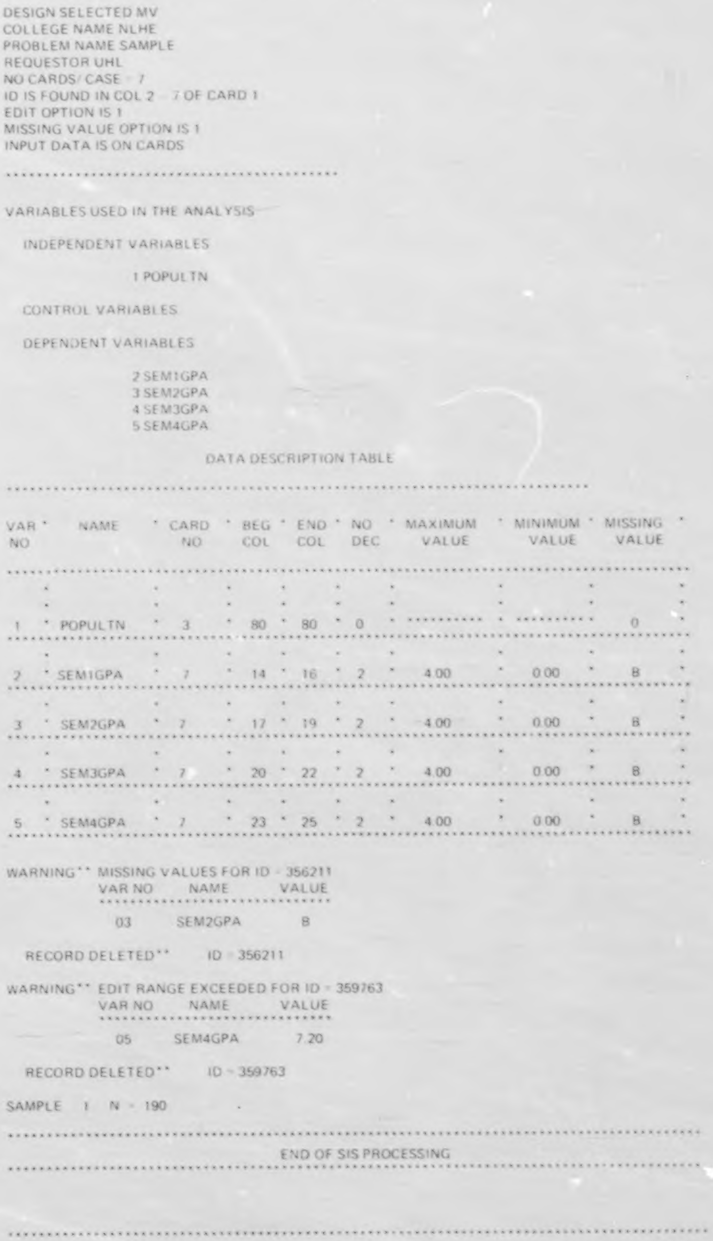
On Form 2 (No. 5) the location of the student's ID is indicated. In Figure 4 (Form 4) the design code for multivariate analysis of variance (MV) is placed, along with the independent and dependent variables.

For this analysis it is desired to eliminate those students checking the third category of the population variable. One way of doing this is to complete the Sample Definition on

Form 4. By indicating that sample No. 1 is the sample to be processed and defining sample No. 1 as those students who responded to variable No. 1 with a value less than 3, only those students from rural and urban backgrounds are included in the analysis (those with a zero or blank have already been eliminated). Thus a convenient procedure for selection of a subsample is provided by the SIS.

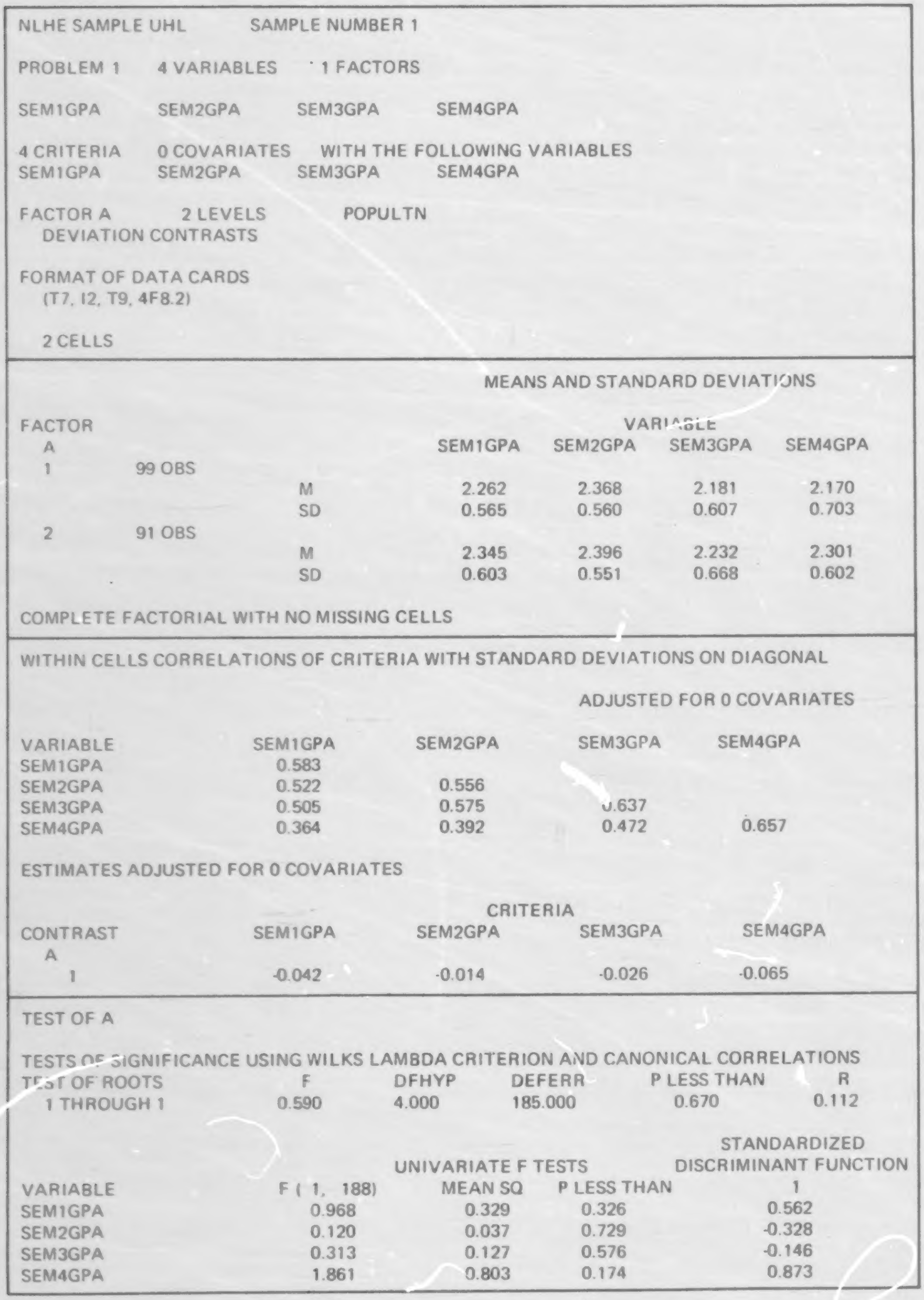
Form 3 was not used in this analysis. However, it is very useful for data conversion, including such features as dividing variables into discrete categories, algebraic conversions among variables or a variable and a constant, and function conversions such as absolute value of variables, average of variables, and date differences.

To illustrate the computer printout, the SIS was used to perform the above analysis with some sample data. Figures 5 and 6 illustrate this output obtained from the computer using SIS to process the data. Each section, separated by horizontal lines, represents a separate page of the printout.



```
DESIGN SELECTED MV
COLLEGE NAME NLHE
PROBLEM NAME SAMPLE
REQUESTOR UHL
NO CARDS/ CASE = 7
ID IS FOUND IN COL 2 - 7 OF CARD 1
EDIT OPTION IS 1
MISSING VALUE OPTION IS 1
INPUT DATA IS ON CARDS

****************************************

VARIABLES USED IN THE ANALYSIS

  INDEPENDENT VARIABLES

              1 POPULTN

  CONTROL VARIABLES

  DEPENDENT VARIABLES

              2 SEM1GPA
              3 SEM2GPA
              4 SEM3GPA
              5 SEM4GPA

                        DATA DESCRIPTION TABLE

**********************************************************************

VAR *    NAME     * CARD * BEG * END * NO  * MAXIMUM   * MINIMUM * MISSING *
NO                   NO    COL   COL   DEC    VALUE       VALUE     VALUE

**********************************************************************************
     *            *      *     *     *     *           *           *           *
     *            *      *     *     *     *           *           *           *
1    * POPULTN    *  3   *  80 *  80 *  0  * ********* * ********* *     0     *
**********************************************************************************
     *            *      *     *     *     *           *           *           *
2    * SEM1GPA    *  7   *  14 *  16 *  2  *    4.00   *    0.00   *     B     *
**********************************************************************************
     *            *      *     *     *     *           *           *           *
3    * SEM2GPA    *  7   *  17 *  19 *  2  *    4.00   *    0.00   *     B     *
**********************************************************************************
     *            *      *     *     *     *           *           *           *
4    * SEM3GPA    *  7   *  20 *  22 *  2  *    4.00       0.00   *     B     *
**********************************************************************************
     *            *      *     *     *     *           *           *           *
5    * SEM4GPA    *  7   *  23 *  25 *  2  *    4.00   *    0.00   *     B     *
**********************************************************************************

WARNING** MISSING VALUES FOR ID = 356211
          VAR NO     NAME        VALUE
          ****************************

            03       SEM2GPA       B

  RECORD DELETED**      ID = 356211

WARNING** EDIT RANGE EXCEEDED FOR ID = 359763
          VAR NO     NAME        VALUE
          ****************************

            05       SEM4GPA      7.20

  RECORD DELETED**      ID = 359763

SAMPLE   1   N = 190          .

***********************************************************************************
                               END OF SIS PROCESSING
***********************************************************************************



***********************************************************************************
```

Figure 5: Pages 1, 2, and 3 of Computer Printout.



```
NLHE SAMPLE UHL          SAMPLE NUMBER 1

PROBLEM 1      4 VARIABLES      1 FACTORS

SEM1GPA        SEM2GPA        SEM3GPA        SEM4GPA

4 CRITERIA     0 COVARIATES    WITH THE FOLLOWING VARIABLES
SEM1GPA        SEM2GPA        SEM3GPA        SEM4GPA

FACTOR A          2 LEVELS            POPULTN
  DEVIATION CONTRASTS

FORMAT OF DATA CARDS
  (T7, I2, T9, 4F8.2)

  2 CELLS
```

```
                                        MEANS AND STANDARD DEVIATIONS

FACTOR                                             VARIABLE
  A                                 SEM1GPA     SEM2GPA     SEM3GPA     SEM4GPA
  1         99 OBS
                         M           2.262       2.368       2.181       2.170
                         SD          0.565       0.560       0.607       0.703
  2         91 OBS
                         M           2.345       2.396       2.232       2.301
                         SD          0.603       0.551       0.668       0.602

COMPLETE FACTORIAL WITH NO MISSING CELLS
```

```
WITHIN CELLS CORRELATIONS OF CRITERIA WITH STANDARD DEVIATIONS ON DIAGONAL

                                               ADJUSTED FOR 0 COVARIATES

VARIABLE              SEM1GPA        SEM2GPA        SEM3GPA        SEM4GPA
SEM1GPA                0.583
SEM2GPA                0.522          0.556
SEM3GPA                0.505          0.575          0.637
SEM4GPA                0.364          0.392          0.472          0.657

ESTIMATES ADJUSTED FOR 0 COVARIATES

                                            CRITERIA
CONTRAST              SEM1GPA        SEM2GPA        SEM3GPA        SEM4GPA
  A
    1                 -0.042         -0.014         -0.026         -0.065
```

```
TEST OF A

TESTS OF SIGNIFICANCE USING WILKS LAMBDA CRITERION AND CANONICAL CORRELATIONS
TEST OF ROOTS              F        DFHYP     DEFERR       P LESS THAN        R
  1 THROUGH 1            0.590      4.000    185.000         0.670          0.112

                                                              STANDARDIZED
                                  UNIVARIATE F TESTS       DISCRIMINANT FUNCTION
VARIABLE            F ( 1,  188)     MEAN SQ     P LESS THAN          1
SEM1GPA                0.968          0.329         0.326           0.562
SEM2GPA                0.120          0.037         0.729          -0.328
SEM3GPA                0.313          0.127         0.576          -0.146
SEM4GPA                1.861          0.803         0.174           0.873
```

Figure 6: Pages 4, 5, 6, and 7 of Computer Printout.

Figure 5 illustrates that the first page of output from SIS provides identification information. This provides a check for the user that the program correctly interpreted the information that was written on the SIS forms. The following page of the printout describes the data being used in the analysis, indicating its location on the input medium (cards, tape, or disk) and the edit values to be used by SIS. Thus, this provides another check for the user on the system. On the third page, the results from SIS editing are given. Although there were 76 edit deletions in this analysis, Figure 5 illustrates only two of these. One student (ID No. 356211) was removed because SIS was instructed to remove any student who did not have a grade point average for any semester. Another student (ID No. 359763) was deleted since his fourth semester grade point average was 7.20 which exceeded the maximum possible value of 4.00 (thus a keypunch error was found and was later given the correct value of 1.20). After all deletions are made the size of the sample to be used in the analysis is given (190). This is the end of the SIS processing and the beginning of the selected MANOVA or BMD statistical analysis. Figure 6 illustrates the MANOVA output for this problem. The third section of the SIS, Interpretation of Computer Printout, is a guide for interpreting the output from any of the statistical programs.

The first two sections of the SIS have been undergoing evaluation. The Design Selection Guide was first evaluated in the Spring of 1971. This evaluation used two different groups: (1) nine people connected with institutional research who had several formal courses in statistics; and (2) twenty-six seniors who had at least one course in statistics as well as a course in research methods. The first group offered several useful suggestions. Results from the second group indicated that the Guide could communicate to people without research experience. Given three separate problems, 80% of these students selected an appropriate design for each problem. A second evaluation was performed using twenty-one seniors in psychology who were completing their second undergraduate course in statistics at NCCU but had no course in research design. These students read through the Design Selection Guide, completed three sample problems, and were then given six test problems. An analysis was made of the types of errors. It was found that of a total of 777 decisions, 697 or 90% were correctly made. A question-by-question analysis also indicated that all questions were answered correctly at least 85% of the time.

To evaluate the Data Processing Guide, several examples of institutional research problems were processed without difficulty by NLHE personnel. The Interpretation Guide is presently being reviewed for completeness.

Evaluation of the complete Statistical Interface System, in contrast to individual sections, starts this summer.

MANPOWER AND WOMANPOWER PLANNING – THEORY AND APPLICATION

Arthur H. Padilla
N.C. Board of Higher Education

INTRODUCTION

The purpose of this paper is to provide a succinct description of various manpower planning tools and their relative effectiveness as related to higher education. Three planning methods will be analyzed: the rate of return approach, the manpower requirements approach and the demographic-economic method, with a brief example of application of the latter. The discussion to follow, then, will concentrate on the relative merits and weaknesses of manpower projection methods, and on their applicability and usefulness to higher education planning problems.

Education was not invented for the sake of production of goods and even today this is not its main purpose. Nonetheless, one can hardly deny its significance for the economic sector of any society and its contribution to our well-being. Indeed, although a university education is a personal satisfaction to the student who strives to achieve the highest intellectual level possible, it also involves the preparation of a person to occupy a place in a complex technological society. Expansion of higher education programs, therefore, should be undertaken only in response to a careful analysis of supply and demand for persons of advanced educational attainment.

Examination of methods which, explicitly or implicitly, have been proposed as planning tools by various authors is now in order. As will be seen, most approaches are much too broad to be of any real use at the curriculum level.

RATE OF RETURN ON INVESTMENT IN EDUCATION APPROACH

The standard procedure under the rate of return approach is to observe, for any given year, and for different age cohorts, the net earnings differentials after taxes associated with different educational levels, and then to calculate the "internal rate of return"[1] which would equate the present value of these expected differentials after adjusting for income-determining factors *other than* education. Rate of return studies generally consider different *levels* of education (i.e., the rate of return to a college degree vs. the rate of return to a high school degree), but the approach can be extended to cover different types of schools, different types of fields of study and other categories. High rates of return in any area would indicate the profitability of investment in that area, and, theoretically, investment should proceed to the point where the rate of return is equal to the cost of capital.

There appears to be a sizable number of objections to the rate of return method, but perhaps the most trenchant objection deals with the fact that education, earnings, native intelligence, individual motivation, and social class are all interdependent, and satisfactory isolation of the effect of education on earnings has not been (and cannot be?) carried out. It is not clear at this time that there exist any standard tests which accurately measure native intelligence (intelligence being defined as Spearman's "g," say). And, as some writers have observed, that which causes some to choose college and others not may be a part of what explains the differences in income streams between the two groups. Moreover, the rate of return approach assumes (implicitly) that people are motivated solely by consideration of monetary gains of additional school attendance. Consequently, the validity of this method is questionable when education is viewed not in a pecuniary sense, but in a psychic sense. Perhaps most relevant to the discussion here is the fact that rate of return studies are not particularly suited to curriculum-level planning. Consequently, the rate of return approach *by itself* will not solve the administrator's problem of which programs to discontinue and which programs to expand.

The inadequacy of the estimated rates of return as a guide to investment in education is clearly pointed out by Renshaw who writes that:

> . . . we are still a long way from the kind of return estimate which would permit economists to answer such questions as: Should we be investing more or less in education? In which direction should we be investing the marginal educational dollar? Would college be a good investment for a particular individual? Is education the instrumental variable explaining economical growth?[2]

THE MANPOWER REQUIREMENTS APPROACH

The manpower requirements approach is quite unlike the rate of return method. The former does not attempt to measure the contribution of education to economic growth or any rate of return to investment in education. The manpower requirements approach looks to the future whereas the other method analyzes the past.

The aim of this method is to estimate the future *needs* of a country in different skills. In a secondary step these estimates are converted to educational requirements for use in planning. It should be clear that the manpower forecasts that underlie the educational planning, as creator H. S. Parnes says, "do not . . . purport to be pure unconditional forecasts. That is, they are not so much predictions of what *will happen* in the manpower field as indications of what *must happen* if certain targets for economic growth *are* to be realized."[3] Parnes continues:

> This brings us to a consideration of what is meant by 'manpower requirements' in this context . . . it is necessary to differentiate between the term manpower

> requirements as used here and the 'demand for labour' as that concept is traditionally used by economists. To the economist, demand for a particular category of labour . . . is actually a schedule of relationships between quantities of labour and a series of possible wage rates . . . From the foregoing it should be quite clear that estimating future manpower requirements in the context of educational planning is not . . . the same thing as forecasting future demand in the market sense. Rather, the idea of manpower requirements as used here relates to the functional (occupational) composition of employment that will be necessary if certain social and/or economic targets are to be achieved. The concept, in other words, is more technological than an economic one."[4]

The basic assumption in the manpower requirements approach, which incidentally has been heavily attacked, is that there are strong complementarities between capital and skilled labor with the production functions of most economic sectors characterized by fixed technological coefficients. This assumption is to be compared with the assumption of substitution between the factors of production implied by the rate of return approach.

While there is a difference between the two approaches as to the assumption of the substitution of factors of production, another difference exists which is more relevant to this discussion. This second difference has to do with the level of aggregation, since the rate of return approach is an aggregate method, and the manpower requirements approach is disaggregate and distinguishes many occupations. Even though, however, the manpower requirement approach is relatively disaggregate, its value to higher education planning may not be very great due to its assumption of little substitution between workers. As Fearn and Ihnen have said, ". . . there are possibilities of substituting one worker for another with somewhat different skills . . . and because these possibilities grow over time, the manpower requirements approach becomes more inappropriate the longer the period for which it is used."[5]

DEMOGRAPHIC-ECONOMIC APPROACH

The third approach, which I call the demographic-economic approach, results from the analysis of economic factors and demographic factors simultaneously. An example of this approach would be the Allan Cartter studies on faculty manpower, which, incidentally, have been impressively accurate to date. The appealing characteristics of this approach is its scientific, yet *ad hoc* nature. It affords one the chance to bring outside knowledge about trends in a particular manpower area and to incorporate it into the projections. But as I have stated elsewhere, "the science of forecasting is an inexact science, and future demand for higher education graduates cannot be predicted with high accuracy most of the time.[6]. Thus any projections made by this approach may not be any more accurate than those obtained by other ways. Moreover, this type of analysis, which relies heavily on such statistics as school-age population and fertility rates, *is only applicable* to those areas where there has been a demonstrable interdependence between population and demand for that type of manpower. Examples are elementary and secondary teaching and college teaching, but even in those two examples the effect of relative wages should be considered. Generally, this type of study assumes that the relative wage will remain constant over the period considered, e.g., the wages of school teachers relative to those of secretaries will not decline sharply. For Cartter's studies, these assumptions have not been too damaging.

A possible implementation of the demographic-economic approach lies in the area of the supply and demand for elementary and secondary teachers. The underlying methodology may be best understood through mathematical formalization of the model.

$$(1)\quad DT = N_{h*}\left[\frac{N_h}{N_{h*}}\cdot\frac{D_h}{N_h}\right] + N_{e*}\left[\frac{N_e}{N_{e*}}\cdot\frac{D_e}{N_e}\right]$$

$$(2)\quad ST = f(W_r, G)$$

$$(3)\quad N_{e*} = \sum_{i=1}^{8} r_{t-5-i}\ f_{t-5-i} + \text{net migration-deaths}$$

$$(4)\quad N_{h*} = \sum_{i=1}^{4} r_{t-13-i}\ f_{t-13-i} + \text{net migration-deaths} - \text{elementary school dropouts}$$

Where
ST = Total teacher supply in year i
DT = Total teacher demand in year i
N_{h*} = Potential stock of high school students in year i
N_h = Actual stock of high school students in year i
N_{e*} = Potential stock of elementary school students in year i
N_e = Actual stock of elementary school students in year i
D_h = Actual stock of high school teachers in year i
D_e = Actual stock of elementary school teachers in year i
r = General fertility rate
f = Stock of females between 15 and 44 years of age
W_r = Relative wage of teachers
G = College graduates

Given the above equations, which simply say that total teacher demand is a function of school-age population and total teacher supply is a function of the relative wage of teachers and the number of college graduates, one can proceed with the projections of the supply and demand.

The advent of more efficient birth control methods, coupled with changing attitudes toward family size, led to a sharp decrease in the number of live births during the 1960's. This decrease in births (down to about 3.4 million during 1971, from roughly 4.3 million during 1960) has put downward pressure on elementary and secondary enrollments across the U.S. As can be seen from Table 1, the figures for North Carolina reveal a peak during the 1971-72 school year and monotonically declining enrollments throughout the 1970's. Note that the school-age population ($N_{h*} + N_{e*}$) reaches a

TABLE 1

North Carolina Public and Non-Public Fall Enrollments (Grades 1-12), School-Age Population, and Projections

School Year	Public		Non-Public		Total	School-Age Population, 6-18 yr. Old
1959-60	1,082,013		Data Not Available			1,230,580
1960-61	1,102,026		Data Not Available			1,253,727
1961-62	1,120,372		Data Not Available			1,271,911
1962-63	1,140,981		Data Not Available			1,295,194
1963-64	1,167,963		Data Not Available			1,321,225
1964-65	1,178,334		Data Not Available			1,326,245
1965-66	1,181,552		Data Not Available			1,333,574
1966-67	1,183,690		Data Not Available			1,336,725
1967-68	1,193,267		18,301		1,211,568	1,342,333
1968-69	1,195,583		21,802		1,217,385	1,347,415
1969-70	1,191,576		27,471		1,219,047	1,347,018
1970-71	1,184,688		36,624		1,221,312	1,337,155
	High	Low	High	Low		
1971-72	1,180,900	1,172,740	52,000	43,800	1,224,750	1,338,525
1972-73	1,173,800	1,157,800	54,600	39,600	1,213,400	1,322,141
1973-74	1,168,100	1,151,600	59,300	41,800	1,209,900	1,319,060
1974-75	1,161,900	1,131,500	64,600	34,200	1,196,100	1,302,909
1975-76	1,156,500	1,120,800	69,000	33,300	1,189,800	1,293,280
1976-77	1,152,200	1,109,700	73,300	30,800	1,183,000	1,286,000
1977-78	1,147,600	1,100,500	76,500	29,400	1,177,000	1,277,000
1978-79	1,143,100	1,090,700	78,300	26,900	1,169,000	1,267,000
1979-80	1,136,600	1,083,200	77,800	24,400	1,161,000	1,255,000
1980-81	1,131,900	1,076,500	78,500	23,100	1,155,000	1,243,000
1981-82	1,123,100	1,065,800	80,200	22,900	1,146,000	1,232,000

Source: N. C. Board of Education (Data Processing and Division of Non-Public Schools), and A. Padilla

Note: Total enrollment is obtained by adding "high" public and "low" non-public *or* by adding "low" public and "high" non-public. Projections under the "total" column assume that a moderate increase in the percent of the 6-18 population enrolled will take place.

maximum in 1968-69, while enrollment ($N_h + N_e$) peaks three years later. This reflects increased retention rates in the system.

Given expected enrollment levels, projections of total teacher (DT) demand can be made. Some care should be exercised in computing the demand since different student-teacher (S/T) ratios would yield different results. In recent years the S/T ratio has shown a downward rigidity, and many expect it to remain inflexible in the downward direction. The likelihood of a drastic reduction in the ratio, in view of the present economic situation and public disappointment with taxation, is not very high. Also, a sizable reduction in the S/T ratio would imply something about teachers' relative wages, for some teachers would have to be coaxed, economically, to leave their present employment alternatives. Reductions in S/T ratios will also lead to higher instructional cost per student, which administrators are currently attempting to decrease, not increase. In any event, Table 2 shows projections of DT assuming a moderate (10%) decrease in the S/T ratio. During the 1960's DT increased about 40%, whereas it is projected to increase 6% during the 1970's. There is no need to remind a mathematically-oriented audience that a diminishing (or negative) rate of growth for the total system implies a declining *absolute* demand for new teachers to meet the increase in enrollment. New programs may create additional or new demand, but the size of this new demand is not known, generally. What, for example, will be the effect of a state supported nursery program?

TABLE 3

Total Supply-Demand Ratios for North Carolina Elementary and Secondary School Teachers, 1967/68 – 1979/80

Year	Unadjusted Supply-Demand Ratio	Adjusted Supply-Demand Ratio
1967-68	1.26	.88
1968-69	1.55	1.06
1969-70	1.85	1.20
1970-71	2.34	1.59
1971-72	2.40	1.70
1972-73	2.60	1.80
1973-74	2.70	1.90
1974-75	2.70	1.80
1975-76	2.80	2.00
1976-77	2.70	1.90
1977-78	3.00	2.10
1978-79	2.90	2.20
1979-80	3.20	2.30

Source: A. Padilla

Note: New supply was adjusted for those new graduates who do not enter teaching the year after graduation in the "Adjusted" column. The North Carolina Department of Public Instruction gathers data useful in the adjustment process.

assumes no changes in student's attitudes toward the teaching profession. Intuitively, if there is the possibility of a large "surplus," many students will choose other fields of study. The purpose of this type of study, then, is not to predict accurately what will happen in 1980, but to inform citizens that there is a real possibility of a "surplus" if things do not change.

It should be mentioned that according to the U.S. Office of Education, the overwhelming majority of elementary teachers in the U.S. (80%) are women. Moreover, nearly half of all secondary teachers are women. Men, however, predominate in the supervisory and administrative positions in both public and private schools.

The projected labor market in elementary and secondary teaching could affect women's professional aspirations in this field, as about 70% of all college graduates who enter teaching are women. Given the future course of college enrollments and number of graduates (more than 40% of all bachelor's and first professional degrees were awarded to women in 1971) many young women may have to seek employment alternatives to teaching during the 1970's. If many of these same women are almost exclusively prepared to teach, then finding alternative careers may be even more difficult.

SOME SUGGESTIONS

It is the demand side of higher education which changes or fluctuates with rapidity, as witnessed in recent months across the U.S. We have come from a seller's market for college graduates to a very bad market in less than two years. The supply (or the output of higher education) is fairly rigid, relative to the demand. College graduates will continue to come regardless of market conditions. To minimize discrepancies between supply and demand either the demand needs to be stabilized or the supply made flexible. It is probably next to impossible to stabilize demand but students (supply) can be made more flexible by giving consideration to the concept of "career alternatives." In structuring certain academic curricula the career options or alternatives approach, an approach which could prepare students in a manner that he/she would have more than one career possibility, should be seriously studied and considered.

Unfortunately, the demographic-economic approach is not applicable to all curricula. For example, the future demand for classical Chinese scholars may not be tied to future population growth or any other predictable variable. It can be said, nonetheless, that for *certain* manpower areas this approach can be of great value to decision-makers and should be encouraged.

So far so good. But are there no "good" scientific methods through which all curricula can be examined? Should decisions on programs be based solely on "hunches" and intuitive feelings? The answer to the latter question should certainly be negative. So long as one grants that manpower considerations are one of the factors which ought to influence educational decisions, then all such decisions, if they purport to be rational, concern some type of manpower forecasts, whether or not they are explicitly made. The decision to expand medical enrollments must imply that the employment opportunities and/or the need for the physicians thereby produced will be growing at a faster rate than the occupational opportunities and/or need for, say, secondary civics teachers; or at a minimum, that the physicians will somehow be of better use to the economy than will the civics teachers, tax dollar for tax dollar. Hence, the relevant question is not whether forecasts should be made, but rather should they be explicitly and systematically conducted?

As relates to the above, statewide and institutional analyses should be carried out and encouraged in a continuous manner on at least the following points.

(1) Salary trends (a measure of demand by field of study). This data can be gathered from various sources, including professional societies, NSF, etc.
(2) Unemployment rates and trends, by field, sex, degree level.
(3) Employability of new graduates.
(4) Supply trends or graduate production trends.
(5) Longitudinal studies on graduates, asking for their opinions about their educational experience. This is possible through placement and alumni offices at the various campuses.

If effectiveness is desired, the results should be widely distributed as *public* knowledge. It is known from research findings that economic incentives are a strong determinant in a student's choice of a field of study.[7] Everything else remaining unaltered, increased wages attract students to a field and add to the supply of specialists in that field several years later (due to the length of educational programs).

In concluding, it would seem that the best avenue for educational program committees to take would be one full of general information on job opportunities and trends and characteristics of the college-trained labor market.

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[1] The "internal rate of return" idea is owed to Gary Becker's *Human Capital* and refers to that interest rate which equates present values of costs and incomes.

[2] E. F. Renshaw, "Estimating the Returns to Education," *Review of Economics and Statistics,* August 1960, pp. 318-324.

[3] H. S. Parnes, "Manpower Analysis in Education Planning," in *Economics of Education,* ed. by M. Blaug (London: Penguin Books, 1971), vol. I, p. 266.

[4] *Ibid.*, p. 267.

[5] R. Fearn and L. Ihnen, "An Economist's View of Planning Problems in Community College Systems," in *Managing the Universities: A Systems Approach,* ed. by P. W. Hamelman (New York: Praeger, Inc., 1971).

[6] A. H. Padilla, "Manpower Forecasts: Teacher Education in North Carolina, 1971-82," unpublished mimeograph, North Carolina Board of Higher Education, Raleigh.

[7] See Richard B. Freeman, *The Market for College Trained Manpower: A Study in the Economics of Career Choice* (Harvard, 1971), esp. chapters 2 and 4.

AN ANALYSIS OF CONSTITUENCY GROUP PRIORITIES OF INSTITUTIONAL GOAL FORMS: INPUT, PROCESS, AND OUTPUT

Daniel R. Coleman
Florida State University

When institutional researchers study their institutions, they have special problems. While the business executive measures success by analyzing profit and loss statements, and the educational researcher measures success by comparing pretest and posttest data or achievement scores of matched groups, the institutional researcher must measure the institution's success by the degree to which its stated goals and objectives are achieved. Accordingly, the problem of setting, implementing, and evaluating institutional goals has become more complicated by the desire for consensus among students, faculty, and administrators.

Another problem which confronts the institutional researcher is the problem of internal consistency from the initial planning stage through the final evaluation process. Educators have tried to solve the internal consistency problem by developing an accurate management information system, forecasting techniques, base line standards, simulation models, and other management schemes to make the stages between resource allocation and achievement of specific institutional goals seem rational. The whole elaborate planning process begins with the setting of institutional goals; yet, research in the area has been limited to a few systematic goal priority consensus studies.[1]

While the task of evaluating an institution's program is difficult when clear, consistent institutional goals have been established and agreed upon by all constituencies, the task is further perplexed if any one constituency has a preference for one goal form statement over another. Gremlins of bias disturb consensus. Furthermore, a consensus achieved under such circumstances would be a biased consensus, and the major significance of the total planning approach would be nullified and evaluation meaningless.

Although the goal topic may be of vital importance in goal development, the goal verb could be the most significant factor in determining goal priorities. The three basic verb classes – input, process, and output – indicate what action was intended by the specific goal statement. The purposes of this investigation were (a) to determine if any constituency preferred one goal verb form over another, (b) to determine whether goal verb form preference patterns were related to constituency group membership, and (c) to determine whether the priorities assigned different goal topics were related to constituency group membership.

Although a theoretical model which exhibits the greatest degree of incongruence among the groups' goal form preferences would be one in which the student constituency selected one goal form, the faculty constituency selected a second goal form, and the administrative constituency selected the third goal form, no specific model was hypothesized for the study. It was the thesis of the investigation that if the form in which goals were stated influenced the determination of institutional goal priorities for any constituency, it would decrease the effectiveness of the long-range planning process unless the bias was eliminated. It is not only a necessity that goals be identified which are clearly understood and agreed upon within the institution, but it is of paramount importance that a high degree of internal consistency be maintained from the planning stages through the final evaluation process to foster the attainment of true excellence.

PROCEDURE

In an attempt to better understand the affect of verb form on goal preferences for the student, faculty, and administrative constituencies, a goal survey was developed which consisted of 19 goal sets. Each goal set consisted of three statements such that the same goal topic was written in three forms – one goal used the input form (to provide . . .), another used the process form (to conduct . . .), and the third used the output form (to produce . . .). The following is an illustration of a goal set:

a. to encourage students to become *broadly* educated.
b. to graduate persons who have a *broad* general education.
c. to provide students with the opportunity to get a *general* education.

The goal survey items were developed to correspond to the interest of the university self-study and to parallel items used in other goal studies. Since goal form was determined by the verb used in the goal statement, the initial step was to establish three mutually exclusive verb sets which classified a goal as providing an input, describing a process, or indicating a desired output. The following is a listing of the mutually exclusive verb sets which were utilized:

Input Verb Set

Admit
Afford
Ensure
Improve
Maintain
Make available
Obtain
Present
Provide
Recruit
Secure
Select
Supply
Support

Process Verb Set

Apply
Augment
Conduct
Develop
Devise
Emphasize
Encourage
Establish
Experiment
Explore
Find
Foster
Increase
Innovate
Inquire
Inspire
Instigate
Introduce
Involve
Orientate
Persevere
Prepare
Promote
Propagate
Solicit
Stimulate
Urge

Output Verb Set

Contribute
Create
Cultivate
Discover
Excel
Exhibit
Gain
Graduate
Grant
Instill
Perform
Produce
Serve
Solve
Take action
Yield

The population of this study included members of the three basic constituency groups of the academic community at Florida State University. A group of 1,100 students, 1,175 faculty, and 315 administrators holding faculty appointments were invited to participate in the investigation. Data for this study were collected as part of the institutional self-study. Each subject was asked to rank the three statements in the order of importance. After the subjects ranked the statements within each goal set, they were asked to select the three goal sets which they considered most important and the three goal sets which they considered least important.

The chi-square analysis was used to test those null hypotheses associated with the goal form preferred and the goal form preference pattern objectives. The first objective which concerned one goal form preference over another was investigated by comparing both the modal goal form selections and the least frequent goal form selections against equal proportionality for each constituency. The second objective which concerned the degree of correspondence among the preference patterns was investigated by comparing the frequency response patterns for each goal set among the three constituencies. The null hypotheses which addressed the association among the rank orders of the most important and the rank orders of the least important goal sets for the student, faculty, and administrative constituencies were tested by the Spearman Rank Correlation Coefficient Test or the Kendall Coefficient of Concordance Test.

RESULTS

The number of usable goal surveys was 1,281. This represented a usable response return rate of nearly 50 percent, with the administrative rate being 64.4 percent, the faculty rate being 57.9 percent, and the student rate being 36.2 percent. Although the goal survey included 19 goal sets, the goal preference analyses included only 16 goal sets. Three goal sets were omitted from the analysis because the final verbs utilized were inconsistent with predetermined verb sets.

The equal proportionality chi-square analyses for the rank-one frequency distributions revealed a statistically significant difference in the number of input, process, and output goal forms selected by each constituency over the 16 goal sets ($p<0.001$). Although the equal proportionality null hypotheses were rejected, the modal selections were judged a tie for the student group's "general knowledge" goal and the administrative group's "new knowledge" goal. Since the chi-square test requires discrete categories, the goal in which the modal selection was judged a tie was dropped in subsequent preference analyses for the specific constituency. It is significant to note that the findings concerning these analyses were not affected by the omission of the item.

Goal Form Preference Analysis

The primary objective was to determine if constituency groups preferred one goal form over another. This objective was tested by a one-sample chi-square test in which equal proportionality was hypothesized ($p_{\text{input}} = p_{\text{process}} = p_{\text{output}} =$ number of goals/3). Table 1 presents a summary of the rank-one modal and least frequent goal form selections. Data in this table reveal that the input and process goal forms were modal selections 43 times (93.5%) and the output goal form was a modal selection only three times (6.5%). Although the output goal was a modal selection in only three instances, the least frequent selection data reveal that the student constituency was the only group which demonstrated a least frequent preference.

An analysis of the goal form modal and least frequent selections for the student constituency revealed a definite trend toward preferring input and process goal forms over the output goal form. The comparison revealed that 12 (75%) least frequent selections were of the output goal form as contrasted to zero modal selections. Accordingly, only one (6.25%) input goal form was a least frequent selection as contrasted to eight (53%) modal selections. The null hypothesis of no difference in the proportion of input, process, and output goal form modal selections of the student population was rejected at the 10% level of significance ($p<0.05$). The corresponding null hypothesis for the least frequent selections was rejected at the 10% level of significance ($p<0.01$). These findings demonstrated that the student population had the greatest preference toward input and process goal forms and the least preference toward the output goal form.

An analysis of the modal and least frequent selections for the faculty constituency revealed a similar pattern for the modal selections. The comparison revealed that although the output goal form was a modal selection only twice (12.5%), the number of least frequent output goal form selections was approximately equal to the expected value. Other differences

TABLE 1

Distribution of Rank One Modal and Least Frequent Goal Form Selections, by Constituency

Constituency	Modal Selections			Least Frequent Selections		
	Input	Process	Output	Input	Process	Output
Student	8	7	0	1	3	12
Faculty	6	8	2	7	2	7
Administrative	6	8	1	7	2	7

between the observed frequency and equal proportionality were small. The statistical analysis of both the modal and least frequent selections did not reveal statistically significant findings at the 10% level. Although a statistically significant difference was not found at the 10% level, the faculty group's modal selection distribution was similar to that of the student group's modal selection distribution. Due to the inherently low power, considerably less than 0.50, of a chi-square analysis with a medium effect size when *N* is equal to 16, no inference could be made with regard to institutional goal form preference for the faculty population.

An analysis of the goal form modal and least frequent selections of the administrative constituency revealed a trend toward favoring the process goal form over the output goal form. Comparison of the two distributions (table 1) revealed findings which were similar to those of the faculty constituency. The null hypothesis of no difference in the proportion of input, process, and output goal form modal selections of the administrative population was rejected at the 10% level of significance ($p<0.10$). The corresponding null hypothesis for the least frequent selections was not rejected at the 10% level of significance ($p<0.30$). These findings demonstrated that the administrative population had the greatest preference toward the process goal form.

Goal Preference Pattern Analysis

The rank-one preference pattern analysis revealed substantial differences among the proportion of input, process, and output institutional goal forms selected by the three constituencies. Figure 1 presents a graphic profile of the aggregate response patterns of the three groups. This illustration exhibits the overall similarity between the faculty and administrative groups' response patterns and it demonstrates the student group's greater preference toward the input goal form over the output goal form as compared to the faculty and administrative groups.

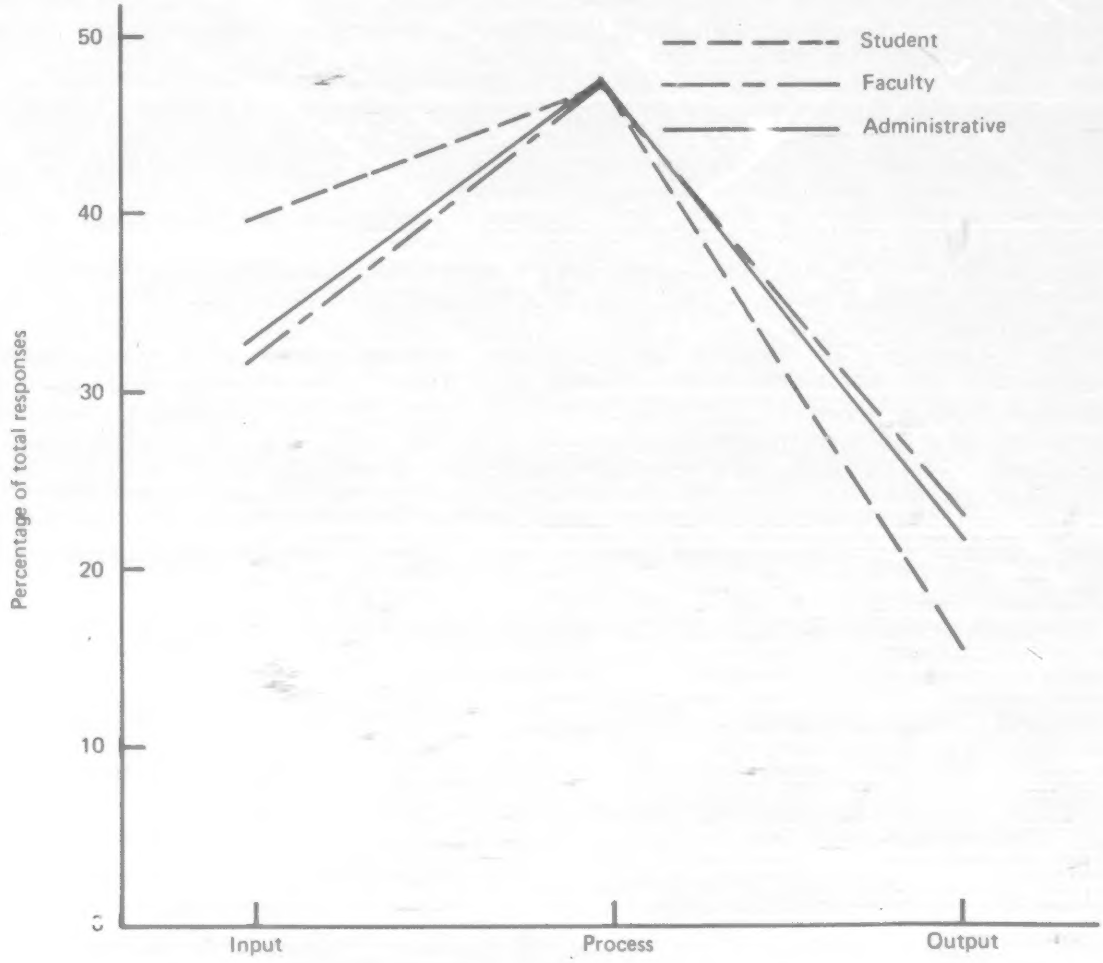

Figure 1: Percentage Summary Frequency Profile, by Goal Form and Constituency

TABLE 2

Constituency Preference Pattern Chi-Square Analysis Summary Table, by Constituency Groups and Goal Areas

Goal Area	Student/Faculty		Student/Admin.		Faculty/Admin.	
	χ^2	p	χ^2	p	χ^2	p
Quality of human life	2.00	0.50	0.19	0.98	0.56	0.95
Major social and environmental problems	7.00	0.05*	1.51	0.50	7.57	0.05*
New knowledge	73.87	0.001*	39.09	0.001*	3.95	0.20
Quality teaching	12.53	0.01*	14.66	0.001*	9.52	0.01*
Broad general education	34.18	0.001*	18.96	0.001*	0.31	0.98
Faculty output	26.95	0.001*	0.95	0.70	10.30	0.01*
General knowledge	28.16	0.001*	15.84	0.001*	1.67	0.50
Cultural values	18.35	0.001*	4.47	0.20	1.21	0.70
Graduate student professional skills	114.37	0.001*	37.54	0.001*	3.55	0.20
Resources for academic pursuit	10.56	0.01*	3.05	0.30	2.54	0.30
Self-renewal	7.83	0.02*	1.09	0.70	2.20	0.50
Student academic quality	35.01	0.001*	19.03	0.001*	3.99	0.20
Specialized training	43.25	0.001*	10.90	0.01*	5.47	0.10*
Interdisciplinary research	102.49	0.001*	47.98	0.001*	0.23	0.90
The arts	9.90	0.01*	6.82	0.05*	3.29	0.20
Graduate education	67.44	0.001*	29.33	0.001*	0.51	0.80

*A statistically significant difference in the constituency preference patterns was noted.

Table 2 presents a summary of the chi-square analysis for between-group comparisons. The null hypotheses of no difference in the proportion of input, process, and output institutional goal forms selected by the student and faculty populations were rejected for all but the "quality of human life" goal. The corresponding null hypotheses for the student and administrative populations were rejected in 10 of the 16 goal areas. These goals are as follows: new knowledge, quality teaching, broad general education, general knowledge, graduate student professional skills, student academic quality, specialized training, interdisciplinary research, the arts, and graduate education. The student/faculty and the student/administrative preference pattern analyses demonstrated specific goal form preference patterns between the populations. In a vast majority of the instances when the null hypotheses were rejected, a larger proportion of the student constituency selected the input goal form and a smaller proportion selected the output goal form as compared to the faculty and administrative constituencies. The "broad general education" goal area was the only instance in which a larger proportion of the student constituency selected the output goal form as compared with either of the other two constituencies. Thus, the inference can be drawn with a considerable degree of assurance that goal form preference patterns were related to the membership of the population.

The faculty/administrative preference pattern analysis demonstrated considerable similarity between the preference patterns of the two populations. Although the comparison of the goal form modal and least frequent selections revealed basically identical findings, the null hypotheses were rejected in one-fourth of the goal areas. Substantial differences were demonstrated between the preference patterns of the following goal areas: major social and environmental problems, quality teaching, faculty output, and specialized training. The preference patterns were judged very similar for five goal areas: quality of human life, broad general education, cultural values, interdisciplinary research, and graduate education.

Goal Priority Analysis

The findings of the priority analysis indicated considerable consensus among institutional goal priorities for the three populations. The null hypotheses of no correlation among the rank orders of the most important institutional goals for the constituency groups and the corresponding null hypotheses associated with the least important institutional goals were rejected at the 5% level of significance ($p<0.01$). No goal was selected as most important by more than one-half of a constituency. Although there was not unanimity among the respondents with regard to the most important or least important goals, there was a high degree of congruence among the six most important goal subsets and the six least important goal subsets of the constituencies. The following are the six most important goals as determined by the total respondent population: quality of human life, major social and environmental problems, new knowledge, quality teaching, management of new knowledge, and synthesize knowledge.

The only major difference in the rank orders of the most important goals occurred among the student constituency rankings and the faculty and administrative constituency rankings for the "faculty output" goal and the "resources for academic pursuit" goal. The student group placed a higher priority on the "resources for academic pursuit" goal and a lower priority on the "faculty output" goal as compared to the other groups.

The findings of the most important goal association analysis evidenced similar results to those of other goal studies. The student group ranked research and research-related activities low and ranked the "broad general education" and "specialized training" goals higher than did the other constituencies, which paralleled the Danforth Foundation study findings.[2] The faculty placed a relatively high priority on the "faculty output" goal – research, creative activities, research publications, and distinguished scholarship – which paralled the Gross and Grambsch findings.[3]

CONCLUSIONS

The findings of this investigation suggest the need for attention to verbs in formulating goal statements. The student constituency demonstrated a definite preference toward the input and process goal forms and a least preference toward the output goal form. The administrative constituency indicated a preference toward the process goal form, but it did not indicate a least frequent preference. Differences which were present among the frequency preference patterns indicated a considerable dissimilarity between the student group's preference patterns and the faculty and administrative groups' preference patterns. Thus, the process of arriving at uniform goal priorities is complicated by the systematic bias of the constituencies. The findings demonstrate that systematic goal statement bias can be eliminated by attending to the verb form used in the formulation of goal statements.

In addition to the bias caused by goal verb form preferences, the investigation revealed other factors which could create systematic bias. These factors include the preference of different verbs within a verb class, the degree of specificity or abstractness of the goal topic, and the constituency most directly affected by the goal. Therefore, the use of heterogeneous goal form statements in goal inventories has been identified as questionable for developing appropriate institutional goal priorities and for fostering internal consistency.

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[1] "A Report: College Goals and Governance," *Danforth News and Notes*, Danforth Foundation, vol. 5, November, 1969, pp. 1–9; Edward Gross and Paul V. Grambsch, *University Goals and Academic Manpower* (Washington, D.C.: American Council on Education, 1968); Ronald Stanley Stead, "An Analysis of the University Goal Perceptions and Preferences of Students, Faculty, Administrators, and Trustees at Michigan State University," unpublished dissertation, Michigan State University, 1971; and Norman P. Uhl, "Encouraging Convergence of Opinion, Through the Use of the Delphi Technique, in the Process of Identifying an Institution's Goals," Educational Testing Service, Princeton, New Jersey, 1971.

[2] "A Report: College Goals and Governance."

[3] Gross and Grambsch, *op. cit.*

FACULTY AND STAFF PERCEPTIONS OF INSTITUTIONAL EMPHASES

Richard E. Grubb
The Pennsylvania State University

A review of the literature concerning the functions and self-renewal processes in higher education reveals differing opinions as to proper functions, lack of agreement on the amount and direction of institutional change, and even less agreement concerning the institutional characteristics or other factors most directly associated with change. However, from the point of view of those charged with the responsibility for managing an institution, changes does become necessary. Before changes are implemented it is important to know if the internal climate is conducive to the changes being contemplated. That is, is there a high or a low desirability among and within institutional groups for the changes being considered.

This paper reports the results of a study which demonstrates an approach to analyzing participant views of their institution as currently existing, and views concerning desired direction of future changes across 11 functional dimensions of the institution. The participants or respondents in the study were a random sample of the faculty and staff of the University Park campus of The Pennsylvania State University.

To accomplish the purposes set forth for the study, it was necessary to develop or identify an instrument which could be used to obtain a perceptual description of the academic functions of the campus. The Institutional Functioning Inventory (IFI), developed at Educational Testing Service in collaboration with Columbia Teachers College, was selected as the basic instrument for use in the study with slight modifications to meet the local requirements of the study.

The IFI was particularly suited for use in this study for several reasons. First, the IFI is primarily directed to use in institutional self-study. The conceptual study of many individuals in developing the IFI lead to the identification of 11 dimensions judged to be important institutional functions or emphases against which in varying combinations an institution may examine itself in terms of its presumed purposes. Further, the IFI is designed to reveal perceptions held by participants in the institution. This perceptual approach makes use of both factual and opinion items and thus provides insight into how participants view their institution. Finally, the instrument enables the researcher to analyze perceptions held by selected participant sub-groups and the sources of disparate beliefs of the work of the institution.[1]

The functional dimensions measured by the IFI include: 1) Intellectual – Aesthetic Extracurriculum (IAE), 2) Freedom (F), 3) Human Diversity (HD), 4) Concern for Improvement of Society (IS), 5) Concern for Undergraduate Learning (UL), 6) Democratic Governance (DG), 7) Meeting Local Needs (MLN), 8) Self-study and Planning (SP), 9) Concern for Advancing Knowledge (AK), 10) Concern for Innovation (CI), and 11) Institutional Esprit (IE).

The modifications made in using the instrument were as follows: 1) Questions were phrased in such a way as to ensure that respondents would react in terms of their local campus situation and not in terms of the total university system. This was necessary to differentiate among the University Park campus and each of the 18 Commonwealth Campuses of the university. 2) In addition to recording perceptions of the present status, respondents were asked to indicate their perceptions of the desired future status in 1980, assuming continued competition for financial, physical and personal resources. 3) Detailed demographic information was requested of each respondent for the purpose of a more varied and detailed data analysis.

In presenting the findings, the eleven IFI dimensions are discussed within three general conceptual groupings – institutional purpose (IAE, UL, AK, MLN, IS) organizational climate (F, IE, DG), and climate for planned change (SP, CI, HD). Also, raw scores are transformed from a scale with a potential range of 0-12 to a scale with a potential range of 0-100.

A total of 1,714 questionnaires were mailed to academic, executive, academic administrative, administrative and staff exempt personnel at the University Park campus. Six hundred and twenty questionnaires were returned, yielding a percentage return of 36%.

Means, variances, and standard deviations were computed for each of the 11 dimensions assessed by the study survey for the perceived present status of the campus, the statement of the desired future status, and the difference of perceived present to desired future ($X_F - X_p$). These computations were made for the total study population and within each independent variable sub-group. The independent variable sub-groups included: (1) college affiliation; (2) primary work activity; (3) academic rank; (4) years of service; (5) AAUP membership status; (6) senate membership status; and (7) graduate faculty membership status. An analysis of variance was performed to determine whether or not mean responses on each of the 11 functional scales differed within the seven independent variable sub-groups.

A summary of the respondents' perception of present and desirable future functional emphases is presented in Table 1. As indicated in this table, respondents perceive the research functions of the university as presently receiving the major emphasis of the basic institutional purposes. Undergraduate learning is perceived as being the least vital area of the institution, indicating that respondents feel that teaching has a low institutional priority or that the quality of teaching is generally poor. Although classroom undergraduate learning is perceived as being a problem area, respondents perceive high opportunity for intellectual and aesthetic stimulation outside the classroom.

The service function of the university is perceived as presently receiving less institutional emphasis than research but more than undergraduate learning. Respondents perceive that an institutional effort is made to provide cultural and educational opportunities for adults in the community and that an even greater effort is made in applying existing

TABLE 1

Summary of University Park Study Population Perceptions of Present and Desired Future Functional Emphases

	INSTITUTIONAL PURPOSES					ORGANIZATIONAL CLIMATE			CLIMATE FOR PLANNED CHANGE		
Total Population	**IAE**	**UL**	**AK**	**MLN**	**IS**	**F**	**IE**	**DG**	**SP**	**CI**	**HD**
Present	72.2	34.3	81.5	53.6	59.8	65.1	64.2	48.2	53.1	60.9	61.8
Desired Future	89.8	85.7	80.3	78.3	80.2	69.9	91.8	82.7	83.7	86.5	76.2
Difference (Future – Present)	17.6	51.4	-1.2	24.7	20.4	4.8	27.6	34.5	30.6	25.5	14.3
t value for Difference	18.30*	50.94*	1.57	22.47*	17.12*	4.04*	23.18*	25.03*	28.34*	21.09*	13.50*

*significant at .001 level

Note: Differences between means are significant at .001 level of confidence if t value is 3.29 or greater.

knowledge and skills in solving social problems at a national level. These perceptions of the present emphases on institutional purposes are not unusual for a large land-grant multipurpose university.

In looking at the organizational climate of the campus, it was found that respondents presently perceive themselves as being essentially free of institutional restrictions on their personal conduct and activities and that a relatively high morale exists among faculty and staff. However, the feeling did exist that many decisions are made on campus without involving those affected.

With regard to the climate for planned change, respondents perceive senior administrators as being relatively receptive to new ideas, that people are encouraged to innovate, and that changes have been made in recent years in educational practices. Also, accepting that personnel resources are a vital part of change processes, the campus is viewed as having made substantial efforts in attracting students and faculty of diverse political and religious attitudes, diverse ethnic and social backgrounds, and of diverse personal tastes and styles. The weakest dimension of the climate for change is perceived to be the institution's efforts in continuous institutional long-range planning and related institutional research.

Turning to the mean scores for the desired future, the most significant use of these scores is in interpreting the corresponding mean scores for perceptions of the present in that direction of movement from the present is indicated when considering both scores. For example, a present mean score of 61.8 on the HD scale may be interpreted as reflecting a perceived high degree of emphasis. However, this score alone does not indicate whether respondents feel that more, less, or the same emphases is desirable to the future. Secondly, the future scores reflect what is considered by respondents to be normative. That is, whether present conditions are viewed as desirable or undesirable.

As could be expected, respondents perceive the future campus situation as being highly vital in all areas assessed. Increased emphases were projected on all functional scales (except research) by most respondent sub-groups. There was general consensus that the research emphasis should remain at its present level.

On the basis of the major findings, it is concluded that respondents perceive the greatest need for change during the next 10 years to be an increase in the effectiveness of undergraduate learning. All major sub-groups studied, including graduate faculty, are in agreement with the need for change in this area. However, the need for the greatest change from the present status is generally expressed by faculty in the lower academic ranks, newer faculty members, those individuals whose work is primarily non-teaching student contact, and faculty of the college of education. The majority of subgroups studied agree that research should continue at its present level of activity, indicating that respondents do not wish to see research sacrificed in favor of resident instruction. The possible exceptions to this may be non-teaching student contact personnel and personnel with over 30 years of service.

There is also agreement among all sub-groups studied that the service function of the institution should receive increased emphasis in the future with the greatest increase in emphasis generally expressed by newer faculty, faculty in the lower academic ranks, and faculty who are members of colleges whose disciplines are in the social sciences and humanities. Thus, it is concluded that respondents see the need for more balance in the emphases placed upon the three classical functions of the university.

It is concluded that the study population perceived the next greatest need for change to be more future student and faculty involvement in the decision-making affairs of the campus. Again, there is agreement among all population sub-groups that change is needed in this area. Those expressing the need for greatest change are teaching faculty, especially those in the lower academic ranks, newer employees, AAUP members, and faculty members of the colleges of education, human development, the liberal arts, and business administration.

Also, while considering the organizational climate of the campus, it should be noted that although a slight increase in individual freedom is projected as desirable in the future by the total study population, large variations in responses are found among sub-groups. Generally, teaching faculty, newer personnel, faculty in the lower academic ranks, and faculty in the colleges of the liberal arts, human development, and business administration see the need for rather significant increases in personal freedom while administrators and supervisors, employees with over 15 years of service, and faculty of the college of agriculture see the need for decreased freedom in the future.

The final major conclusion drawn is that respondents see the need for greater future planned institutional change, especially in the area of continuous long-range institutional planning and related institutional self-study. To a slightly lesser extent, respondents see the need for additional future emphasis on experimentation with new ideas for educational practice. Both of these views are held by all study population sub-groups. However, greater future change is projected as being needed by fewer employees, faculty in the lower academic ranks, lecturers in the graduate faculty, non-administrators, faculty who never served on the university senate, and faculty of the colleges of education, and the liberal arts.

It should also be noted that more future diversity in the faculty and student body is desired by most population sub-groups, although this is a lower change priority for most sub-groups. In general, faculty of the non-professional colleges, non-administrators, newer employees and faculty in the lower ranks feel the greatest need for an increase in student and faculty diversity. The only persons projecting as desirable less future diversity are employees who have served the university for 30 years or longer.

Although respondent sub-group perceptions concerning changes in emphases are briefly referred to above, the detailed analyses of the relationship found between the independent variables of the study (college affiliation, etc.) and the dependent variable (respondent perceptions) are not reported in this paper other than to illustrate the type of analyses conducted.

An analysis of variance was performed within each of the seven independent variables on the mean scores for (1) the perceived present, (2) the desired future, and (3) the difference between the perceived present and desired future. Table 2 illustrates the results of the analysis performed on the

TABLE 2

Summary of Analysis of Variance Performed on Mean Scores for Present Functional Emphases

		Institutional Purposes					Organizational Climate			Climate Planned Change		
VARIABLE		**IAE**	**UL**	**AK**	**MLN**	**IS**	**F**	**IE**	**DG**	**SP**	**CI**	**HD**
College Affiliation (Degrees of Freedom = 11)	1.	1.715	3.081	2.144	2.729	4.680	0.466	4.904	3.627	2.109	3.569	1.358
	2.	NS	.01	.05	.01	.01	NS	.01	.01	.05	.01	NS
	3.	Acc.	Rej.	Rej.	Rej.	Rej.	Acc.	Rej.	Rej.	Rej.	Rej.	Acc.
Primary Work Activity (Degrees of Freedom = 5)	1.	3.163	1.256	9.113	0.701	2.882	3.200	3.513	2.544	5.795	3.242	6.274
	2.	.01	NS	.01	NS	.05	.01	.01	.05	.01	.01	.01
	3.	Rej.	Acc.	Rej.	Acc.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.
Academic Rank (Degrees of Freedom = 5)	1.	1.493	7.941	6.292	4.686	2.731	4.635	2.425	2.380	5.47[illegible]	5.851	6.167
	2.	NS	.01	.01	.01	.05	.01	.05	.05	.01	.01	.01
	3.	Acc.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.
Years of PSU Service (Degrees of Freedom = 2)	1.	1.731	7.672	7.242	7.204	15.774	14.833	12.460	17.363	46.161	33.472	18.903
	2.	NS	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
	3.	Acc.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.
AAUP Membership Status (Degrees of Freedom = 1)	1.	12.907	0.110	5.143	0.008	0.021	1.791	4.579	3.945	0.375	0.046	0.712
	2.	.01	NS	.05	NS	NS	NS	.05	.05	NS	NS	NS
	3.	Rej.	Acc.	Rej.	Acc.	Acc.	Acc.	Rej.	Rej.	Acc.	Acc.	Acc.
Senate Membership Status (Degrees of Freedom = 2)	1.	1.704	2.819	10.298	1.319	3.193	8.128	4.268	2.355	9.629	8.391	9.661
	2.	NS	NS	.01	NS	.05	.01	.05	NS	.01	.01	.01
	3.	Acc.	Acc.	Rej.	Acc.	Rej.	Rej.	Rej.	Acc.	Rej.	Rej.	Rej.
Graduate Faculty Membership Status (Degrees of Freedom = 3)	1.	3.140	12.648	8.978	1.171	2.751	5.468	3.878	5.841	4.802	4.953	3.748
	2.	.05	.01	.01	NS	.05	.01	.01	.01	.01	.01	.05
	3.	Rej.	Rej.	Rej.	Acc.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.	Rej.

1. F value
2. Probability
3. Null Hypothesis

mean scores for the perceived present. An examination of the table reveals that the null hypothesis was rejected in 58 of the 77 combinations tested, indicating a relationship between the independent and dependent variables.

Mean scores for the perceived present and desired future were summarized for each of the 11 scales within each of the seven independent variable sub-groups. Table 3 illustrates the summary of scores based upon the academic rank of respondents. In studying this table, one can see that instructors and assistant professors have the lowest average mean scores for the perceived present across all functional areas. In examining the average mean scores for the desired future, the pattern is less distinct. However, assistant professors tend to perceive the greatest level of future emphasis as being desirable and those with no academic rank perceive the lowest level as being desirable. When considering the magnitude of future change from the present, instructors project the need for the greatest increased emphasis on all scales except F and HD. On the other hand, professors see the need for least change from present to future across all scales. Similar analyses were made within the remaining six independent variable sub-groupings.

In summary, this paper reports an approach for analyzing participant views of their institution. A study reported by Hefferlin[2] indicates that the personal orientation of participants plays a significant role in the processes of institutional reform. By examining responses of the various sub-groups comprising an institution, sources of disparate beliefs can be identified which will provide additional input in the decision-making processes.

For example, in the study reported, a high desirability for change would be that situation where there is either (a) a lack of congruence concerning present conditions and a high congruence on what conditions should be in the future within any given sub-group, or (b) a high congruence that present emphases are low and a high congruence that emphases should be high in the future.

The probability of successfully making changes is directly related to the members' desire to see changes. Therefore, high probability of success is predicted where there is high within-group congruence and no significant among-group differences on what the future situation should be.

TABLE 3

Summary of Mean Scores for Perceptions of Present and Desired Future Functional Emphases by Academic Rank

	Institutional Purposes										Organizational Climate						Climate for Planned Change					
	IAE		UL		AK		MLN		IS		F		IE		DG		SP		CI		HD	
ACADEMIC RANK	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$	$\bar{X}_P$	$\bar{X}_F$
Instructor	71	86	28	89	81	76	46	80	53	82	63	75	63	91	42	83	43	82	53	86	60	78
Assistant Professor	70	90	32	87	79	80	49	80	57	83	61	74	62	90	44	84	50	84	59	89	56	80
Associate Professor	76	92	35	85	83	83	57	79	61	82	66	71	63	92	50	87	56	84	63	89	64	78
Professor	73	90	43	83	86	85	54	71	64	77	70	70	70	92	54	83	58	84	69	88	67	75
No Academic Rank	71	89	30	87	78	76	56	83	59	80	63	65	63	92	47	79	52	84	56	82	61	73
Level of Significance (P)	NS	NS	.01	.01	.01	.01	.01	.01	.05	NS	.01	.05	.05	NS	.05	.01	.01	NS	.01	.01	.01	.05

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1. For a more detailed description of the nature, development and uses of the Institutional Functioning Inventory, see R. E. Peterson, J. A. Centra, R. T. Hartnett and R. L. Linn, *Institutional Functioning Inventory Preliminary Technical Manual* (Princeton: Educational Testing Service, 1970).

2. J. B. Lon Hefferlin, *Dynamics of Academic Reform* (San Francisco: Jossey-Bass, Inc., 1969).

DELPHI DECISION METHODS IN HIGHER EDUCATION ADMINISTRATION

Robert C. Judd
The University of Toledo

The use of Delphi in higher education decision making has been too often a reluctant admission on the part of administrators who have used it. It is my conviction that the Delphi technique deserves recognition as a legitimate research tool any administrator could proudly claim to use when and where he sought qualitative sociological goal and objective inputs to his decision process.

Too often in the past four years of experience with Delphi in an educational setting there is a reluctance to admit its use, even a prohibition to identify its use. Thus, the first two experiences of this writer with Delphi in higher education to this day forbid identification. Perhaps this condition is changing. There are presently two major Delphi projects being conducted where secrecy is not the rule. The first of these was reported on by Dr. Robert Wallhaus, Director of the Research and Development Division of the National Center for Higher Education Management Systems at WICHE in the afternoon program (May 1, 1972). The educational statesmanship of NCHEMS in describing the preliminary findings at this series of meetings is commendable.

The second current Delphi is not as far along – no preliminary findings are yet available – but funded by the U. S. Office of Education, The New Hampshire Coordinating Board project, and directed by Dr. Dennis Binning of Decision Research Inc., it will be fully reported upon when completed. It has been the writer's privilege to be associated with each of these undertakings as a consultant.

It seems most useful, if Delphi is to become a respected research tool, to concentrate in this report on discussing methodology and to illustrate this with exhibits of what works and how it works in Delphi studies of the size involved in the NCHEMS or New Hampshire projects.

The NCHEMS study invited participation of 525 persons across the country of which 385 accepted for a 73% rate of participation. Some of the titles of those who formed this Delphi panel are:

Congressman
Governor
State Legislator
Federal Staff member (HEW, USOE, U.S. Congress)
Foundation Staff member
Lay Board member, Trustee, or Regent
Member of the National Education Association
Member of an educational bargaining unit
Board member or Commissioner of a National or Regional Educ. Board
Staff Member of a National or Regional Educational Board or Commission
Member Accreditation Agency
Consultant in Postsecondary Education
Student
Faculty
Department Chairman or Dean of Academic Instruction
College or University MIS or Computer Center Director or Staff
College or University Finance Administrator or Staff
College or University Director or Staff for: admissions, registrations, community services, personnel, public relations, physical plant, housing.
College or University President or Vice-President

The first questionnaire round of the NCHEMS study was mailed on January 2, 1972, and brought responses from 281 for a 74% rate of return. The responses were answers to five unstructured answer spaces that invited suggestions about changes expected in postsecondary education in the next 20 years. These numbered almost 1400 individual statements. The task of editing statements such as these is a little understood art. But edited, these were, in just five working days into 118 statements. Some feeling for this process may be found in these notes on the NCHEMS editing process.

Each questionnaire of round one was coded upon receipt and then copied on a copying machine. The original was filed and the copy was cut into as many slips of paper as it had answers. Typically, all five answer spaces had been used by the panel member responding. The editing steps involved: 1) picking up an answer slip; 2) reading the response; 3) scanning the master list of previously classified answers to determine if this slip fit one of those categories; 4) writing the number of that classified answer on the slip in hand; and 5) placing the answer slip with the number thus assigned on the finished pile. The variation in the time it takes to deal with a single answer slip in this fashion varied from as little as 5 seconds to as much as 210 seconds in one time study of the process at NCHEMS. The mean, including such extremes, was 37 seconds; the modified mean was 24.5 seconds. The editing team at NCHEMS made substantial progress. Obviously, until the master list of previously classified answers began to build up, each new answer slip represented a potential addition to that master list. The editing team decided on 30 answers for the master list in the first day of editing and this grew as follows:

1st day	30 change statements
2nd day	72 change statements
3rd day	92 change statements
4th day	104 change statements
5th day	118 change statements

From the third day on the following was a typical situation facing the editors:

13 new questionnaires received would yield
60 answer slips of which
48 were found to express much the same idea as already identified in the master list, but
12 were initially thought by an individual editor to be new and thus were set aside for consideration by the whole editing team. From this came
5 statements that were judged to be truly new and were thus added to the master list.

The accomplishments of the editing team in the NCHEMS study are outstanding and their techniques are treated in detail in a forthcoming report.

Some sense of the differences in Delphi technique and their consequences can be seen by comparing the situation described above with the New Hampshire study described below. The first questionnaire round of this study was mailed on February 4 and 103 responded for a 91% rate of return. Page one of the New Hampshire Delphi contained five sentence completion opportunities for the panel respondents. Each of the four of these sentence fragments contained a pre-selected verb forcing a choice of the sentence ending. The fifth sentence fragment left the choice of the verb open to the respondent. A very few respondents did not make any fifth choice; most gave five answers. Page two of the New Hampshire instrument contained nine sentences to be completed on quite specific aspects of higher education. These two pages in the New Hampshire study thus invited substantially more response than was the case in the less structured NCHEMS study and this resulted in more than 1400 responses to edit generated by less than one-third as many panel members.

Some appreciation for the much greater task facing the New Hampshire editing team is found in these notes from the handling of 43 round one questionnaires received:

On Page 1	*Verb Completions*	*Yield*
	"Increasing"	20 different answers
	"Solving"	33 different answers
	"Developing"	30 different answers
	"Providing"	22 different answers
	"__________"	17 different answers

Thus 122 statements were generated by these 43 respondents. Page two created a worse problem, partly because there were nine answer opportunities and partly because responding panel members had so many different ways of expressing their views. With the same group of 43 round one returns, the page two tabulation looked like this:

Statement No.	*Number of Apparently Different Answers*
1	13
2	15
3	22
4	18
5	17
6	29
7	29
8	26
9	18

These 187 additional answers, when added to the 122 that page one generated, make it clear why conventional wisdom with respect to Delphi asserts the preferability of a limited number of answers to be sought in round one.

However, another aspect of conventional wisdom with respect to Delphi is challenged by comparisons between the NCHEMS and the New Hampshire Delphi studies. This is the doctrine that it is critical to get response back to the panel members very promptly. This was followed by the NCHEMS study in mailing round two within 3½ weeks after the round one mailing. The New Hampshire round two divided into two parts, and the first part, comprising 92 statements, was mailed seven weeks after round one; the second part of round two was mailed even later.

Despite this departure from standard practice, the New Hampshire rate of return for round two was 86% (a decrease of only 6 panel members from round one, 97 vs. 103), while the NCHEMS study got only an 81% return. The reasons for this are not clear. It may be that the in-state loyalty of the New Hampshire panel members accounts for some part of the greater response, so too could the excellent graphics used in the New Hampshire study.

The NCHEMS study has been completed and the preliminary findings have been reported elsewhere as commented upon earlier. One aspect of that report has a bearing on this paper. The cumulative participation by NCHEMS panel members is over 90%. That is, on one or more rounds of the five round Delphi study, more than 90% of the 385 panel members did participate by returning their answers. When the New Hampshire study is completed, it will be interesting to discover the comparable statistic for that study.

One of the most dramatic achievements in the NCHEMS study was the creation of a computer print-out which was then micro-copied and reproduced in rounds three, four and five. This gave each panel member a complete tabulation of: 1) the range of answers received on each of the 118 change statements; plus 2) the inter-quartile range; 3) the median; and finally 4) the respondent's own previous round answer. This kind of feed-back has never before been given to Delphi panel members involved in an educational Delphi study. The experimentation by the NCHEMS staff with computer related Delphi undertakings has led to their creation of a prototype time-sharing program which appears capable of permitting a Delphi to be conducted between a number of panel members simultaneously through the use of computer terminals.

In view of the developments in Delphi technique represented by these two large studies, it seems likely that increased use of the Delphi technique can be expected. One of the critical needs in expanding its usefulness is that more attention be paid to sharing not only the details of Delphi findings, but to sharing the details of Delphi study operations. Only in this way can the best that is known be effectively shared with others who want to use this technique.

NOMINAL GROUPING TECHNIQUE: A NEW APPROACH FOR ACHIEVING CONSENSUS

Emmett T. Kohler and Clement D. Pangallo
Mississippi State University

The primary objective of this paper is to describe the use of a nominal grouping technique[1] at an early stage of institutional reformation. The methodology followed in an actual institutional research project is presented here to illustrate in detail the application of the technique and the utilization of the results to date. A discussion of the technique including its problems and advantages as well as other situations where the procedure might be appropriate, is included.

In an attempt to improve the quality of instruction at Mississippi State University, a continuing committee was established in the spring of 1971 to recommend to its president means for improving instruction. The first steps in seeking solutions to the instructional problems were to:

1. Determine what the perceived problems are.
2. Attempt to reach a consensus concerning these problems.
3. Establish priority for dealing with the perceived problems.

The Office of Institutional Research was asked to become an ex-officio, nonvoting member of this committee, serving in a consulting and supportive capacity.

Some of the behaviors manifested in traditional task-oriented groups have been referred to in the literature as "nonfunctional roles." The behavior exemplified by these roles does not contribute to the group but acts only to satisfy personal needs and can be an extremely disruptive impediment to reaching the group's goals. Examples of this behavior include:

1. Blocking–Interfering with the progress of the group by going off on a tangent–*i.e.* reciting personal experiences unrelated to the group's task, arguing a point which the rest of the group has resolved, repeating ideas, preventing a vote.
2. Agression–Criticizing or blaming others, showing hostility toward the group or some individual without relation to what has happened in the group, deflating the ego or status of others.
3. Seeking recognition–Attempting to call attention to oneself by excessive talking, extreme ideas, boasting.
4. Special pleadings–Introducing or supporting ideas relating to one's own pet concerns or philosophies beyond reason and attempting to speak for special interests.
5. Withdrawing–Acting indifferently or passively, resorting to excessive formality, doodling, whispering to others.
6. Dominating–Trying to assert authority in manipulating the group or certain members of it by "pulling rank," giving directions authoritatively, interrupting the contributions of others.[2]

The Delphi Technique, the brainstorming technique, and the nominal grouping technique were considered as methods for controlling these behaviors. Brainstorming is a method for quickly listing group members' ideas in a free-association atmosphere. Theoretically, members are free from challenge or censure of others. This technique was rejected as too inefficient, too easily dominated in our situation, and too easily distractible from its goals.

The Delphi Technique was developed as a means for seeking group consensus through the use of a carefully designed program of sequential interrogation interspersed with information and opinion feedback. Early applications were used to forecast future events and conditions. Since the questioning is conducted through a series of questionnaires, the participants never actually interface with each other and consensus is achieved through isolating extreme responses and requesting defense of these extreme positions. For the purpose of attempting to realize the Instructional Improvement Committee's goal of problem identification, the use of the Delphi Technique was rejected for two reasons: (1) Since the use of a questionnaire is inherently directional, it may not anticipate correctly the problems perceived by the respondents; and (2) the size of a representative sample of faculty and students would have made categorization and interpretation cumbersome.

After investigating alternative approaches to the identification of perceived problems, the nominal grouping technique was chosen as a data collection tool. It was felt that nominal grouping would not only elicit maximum participation from those faculty and students selected, but would also compensate for some of the inadequacies of a traditional committee organization. Nominal grouping offered the potential to yield insight that might not otherwise have been disclosed through the use of a traditional questionnaire.

Nominal grouping was also preferred because of its structure, its relatively simple application, its capability for generating a plethora of responses, and the controllability of nonfunctional roles that the group members may assume. In nominal grouping, client involvement begins with the identification of a cross section of responding groups. These groups are then divided into categories which best suit the nature of the project in question. A representative sample of respondents is brought together to identify their individual and common problems. These problems are referred to as personal (emotional) dimensions and organizational dimensions. These two dimensions serve as the focal issues around which new programs will emerge. This point appears to be a key difference between nominal grouping and the more common Delphi Technique. Both techniques have as a goal the planning of the program. The Delphi Technique does so by first endeavoring to forecast the future, while nominal grouping attempts first to identify the existing program problems to use as a base for developing solutions, such as altering existing programs or developing new ones. The problem emphasis in nominal grouping is on both emotional and organizational dimensions.

Delbecq and Van de Ven describe a nominal group in the following manner:

> Imagine a meeting room in which seven to ten indiv-are sitting around a table in full view of each other. However, they are not speaking to each other. Instead, each individual is writing on a pad of paper in front of him. At the end of 10 to 20 minutes, a very structured sharing of ideas takes place. Each individual, in round-robin fashion, provides one idea from his private list which is written on a flip-chart by a recorder in full view of other members. There is still no discussion, only the recording of privately generated ideas. This round-robin listing continues until each member indicates that he has no further ideas to share . . . . Generally, a spontaneous discussion then follows for a period (in the same fashion as an interactive group meeting) before nominal voting. Nominal voting simply means that the selection of priorities . . . is done by each individual privately, and the group decision is the pooled outcome of the individual votes. [3]

METHOD

Subjects

A modified, stratified, proportional random sample of 300 students was selected to respond to the questions posed in the nominal grouping procedure. The sample was so structured that 60 students from each class, freshmen through graduate, were represented. Each class sample of 60 was proportionally represented by sex and college. Each of the 300 students selected by the sampling procedure was personally contacted by his major department and each received a personal letter from the president of Mississippi State University requesting his cooperation. The sample actually responding contained approximately 18 freshmen, 36 sophomores, 42 juniors, 38 seniors, and 48 graduate students.

The faculty sample was drawn in a similar fashion. Each of the 143 faculty members selected was contacted through a personal letter from his dean and the president of the university. The sample was originally constructed in a manner to ensure that each college would have a representative from each rank. After this initial criterion was met, the remaining sample was drawn in proportion by rank. The original faculty sample was composed of 31 professors, 42 associate professors, 51 assistant professors, and 19 instructors. These numbers reflect the approximate proportions of these ranks in the total faculty. Exceptions to the sampling scheme were instructors in the College of Agriculture, and professors and instructors in the College of Forest Resources, who were not represented. Of the 143 faculty members contacted, 102 responded. There were approximately 24 professors, 30 associate professors, 36 assistant professors, and 12 instructors.

Procedure

The steps involved in nominal grouping were essentially the same for both the faculty and the student samples. Under the supervision of the members of the Instructional Improvement Committee, they were given verbal instructions on the nominal grouping technique, written directions on the steps involved in the procedure, and the two questions to which they were to respond. In the case of students, the questions were:

1. What are the instructional problems at Mississippi State University that prevent students from developing their maximum potential?

(This was considered to be an organizational dimension.)

2. What are the personal difficulties that may be hindering you or your classmates from developing yourselves as students?

(This was considered to be a personal or emotional dimension.)

The steps in the nominal grouping procedure were as follows:

1. The subjects were divided into groups of six to ten, homogeneous with respect to class or rank.
2. Without interaction, they listed the problems they felt were associated with question 1 and then question 2. Twenty minutes was allowed for this activity.
3. A recorder was selected from each group. The recorder then asked each member of the group one at a time to read from his list one problem associated with question 1. The recorder wrote each problem down in plain view exactly as it was read. Then he asked those having the same problem to raise their hands and the recorder marked a check for each person raising his hand. When all the question 1 problems were recorded, he repeated the above procedure for question 2.
4. Next, each group discussed the two lists of problems, clarifying, defending, elaborating, and adding other items if necessary. Approximately 10 minutes was allowed for this procedure.
5. The fifth step was without interaction. Each member privately listed the five items he considered most crucial with reference to question 1. Then he listed the five he considered most crucial with reference to question 2. These were listed on an index card.
6. The recorder collected these index cards and recorded the votes. At this point, the recorder placed all the material from his group into one envelope that was identified in order to facilitate analysis of the responses therein.

This terminated the nominal grouping procedure as far as the respondents were concerned. The envelopes were returned to the Office of Institutional Research, where, in conjunction with the committee chairman, the items receiving the most votes were transcribed and distributed to the members of the committee for their reaction and discussion.

The procedures followed for the faculty sample were essentially the same. However, the two questions were tailored to reflect a faculty rather than a student respondent.

Analysis

The analysis of the data produced from the nominal grouping technique consisted mainly of simple tabulation. The literature does not give many hints as to how to handle the large volumes of data that could be produced from the nominal grouping procedure. It became clear that some data reduction procedure must be utilized. At this point, the committee suggested categorization of the many responses generated. The following question arose: If we do categorize and reduce the data produced, can we meaningfully assign individual responses to the categories? Some measure of the ability of judges to agree on the assignment of responses to categories was needed. Towards this end the committee agreed that the following were meaningful categories: testing and grading, teaching techniques and qualifications of teachers, teacher relationships, departmental, curriculum, physical plant, and administrative problems.

Seven committee members independently assigned the student responses to these seven categories. A common-elements correlation analysis[4] was computed between each pair of categorizations. Then an average common-elements correlation was computed for each of the categories.

RESULTS

The volume of data produced by utilizing the nominal grouping technique for such large samples proved to be a problem. However, upon examination of the student responses, the committee was able to group them into seven independent categories. The categories and a typical response for each are shown in Table 1. Only the data for student question number 1 are reported here.

Problems associated with teaching techniques and qualifications seem to be the most serious. Testing and grading problems were the next most often mentioned problems.

The committee, after study of the individual faculty responses, agreed that 10 categories would capture most of the responses produced for faculty question 1. Table 2 shows the 10 categories with a typical response for each.

TABLE 1
Categories and Sample Student Responses to Nominal Grouping Question No. 1

Question 1. What are the instructional problems at Mississippi State Univeristy that prevent students from developing their maximum potential?

Category	Sample Response	Percent of Response
Teaching Techniques and Professor Qualifications	The patterns of teaching by most professors are strictly lecture. It becomes boring when done the whole period. Use of different teaching techniques or training aids would help solve the problem.	33.8
Testing and Grading	Testing procedure should be revised to obtain a better idea of what a student knows.	17.2
Faculty	Lack of (instructor) interest in teaching and lack of interest toward various viewpoints.	13.9
Pupil Relationship	The fact that many teachers are standoffish and they do not deal too closely for fear of being "brown-nosed".	12.3
Curriculum	Having to take courses in which I have little interest and which fail to make me a more rounded person.	8.8
Administration	Lack of scope and specialties offered, inadequate facilities and monetary support of program.	7.5
Physical Plant	Not enough facilities to accommodate all students in a particular class.	6.5

The impression gained from the data was that the most severe problems centered on the administration. For example, excessive class size and unsupervised graduate assistants were most often cited as problems. The faculty responses to the second question were somewhat similar to those produced by the first and will not be reported here in great detail. However, the two most frequently mentioned problem areas for the second question were administration and facilities. The third most mentioned grouping was lack of external reward.

The results of the common-elements correlation analyses, based on the committee's ability to categorize the student responses, are presented in Table 3.

TABLE 2
Categories and Sample Faculty Responses to Nominal Grouping Question One

Question 1. What are the instructional problems at Mississippi State University that prevent students from developing their maximum potential?

Category	Sample Response	Percent of Response
Administration	Administration's attitude is to economize and teach courses cheaply.	25.7
Instructional Facilities	Poor classroom atmosphere – acoustics, lighting, lack of air conditioning.	15.3
Instructor Affective	Failure of instructor to motivate students.	14.1
Student Defects – Cognitive	Inadequate background of students in communicative arts and mathematics.	14.1
Instructor Teaching Techniques	Failure to state objectives of courses clearly and in measureable terms.	9.4
Student Defects – Affective	Lack of motivation and intellectual curiosity.	7.2
Student Guidance	Inadequate testing procedures for initial guidance.	5.9
General Learning Environment	Lack of emphasis on academic environment & student orientation sessions.	3.6
Instructor Cognitive (Discipline)	Lack of knowledge of subject matter.	3.6
Lack of External Reward for Teachers	Recognition of superior teaching not comparable to that for even mediocre research.	1.2

TABLE 3
The Mean, Lowest, and Highest Interjudge Common-Elements Correlations by Category for Student Question No. 1

Question 1: What are the instructional problems at Mississippi State University that prevent students from developing their maximum potential?

Category	Mean	Lowest	Highest
Testing and Grading	.86	.76	.95
Teaching Techniques and Professor Qualifications	.75	.61	.86
Pupil Relationships	.70	.54	.83
Faculty	.69	.54	.79
Curriculum	.65	.48	.82
Physical Plant	.65	.42	.91
Administration	.50	.23	.85

As can be seen from examining Table 3, the mean common-elements correlation ranges from a high of .86 to a moderate .50. However, it should be noted that if one of the faculty members had been excluded from this analysis, all of the mean correlations would have been much higher.

DISCUSSION

The problems disclosed through the applications of the nominal grouping technique were encouraging in that those perceived by the students and faculty were ones that lend themselves to solutions. For example, many of the problems in testing and grading and those associated with teaching techniques are amenable to solution through in-service training programs. The discouraging aspect of other responses is that some very difficult problems were brought to light. They are difficult in that they relate to student/faculty interpersonal relationships and the perceived lack of academic competence of the professors. Efficient and valid courses of remediation of these problems are not so clear.

In retrospect, the nominal grouping technique appears to be quite promising for data collection and as a means for reaching consensus. It is essentially unstructured, as opposed to the questionnaire, and offers a means whereby a sample of student and faculty opinions can be obtained without the built-in bias of standard opinion questionnaires that are structured on an *a priori* basis. From our observations, the nominal grouping technique seemed to minimize the problems associated with the nonfunctional roles mentioned earlier. In addition, it allowed a consensus to be reached without the structuring of the Institutional Improvement Committee.

It is our belief that the modern university in many ways reflects Toffler's [5] idea of an adhocracy. An adhocracy is a group of people brought together for the solution of specific problems and then disbanded. Within the university there are many identifiable groups. These groups include students, faculty, administration, and alumni. In addition to these, one might add other groups, such as political entities, governing boards, the general public, and external organizations made up of members of the institution, such as unions. If we believe that all of these groups can bring a certain expertise to the solution of specific problems of higher education or those presented to higher education for solution, then some method that would facilitate the expression of these groups' diverse and often explosive views would appear to be a worthwhile technique. Nominal grouping seems to offer such a means. In nominal grouping, direct confrontation is minimized, and the procedure allows for maximum participation of all members of the group by reducing the opportunities for domination of the group by the more powerful, disruptive, or erudite members.

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INSTITUTIONAL RESEARCH AS A CHANGE AGENT IN MARYLAND'S COMMUNITY COLLEGE SYSTEM

Paul G. Larkin
Prince George's Community College

A survey was recently conducted to determine the institutional research activities and products which represent the current status of institutional research in Maryland's network of public community colleges.

Institutional study is defined here as any inquiry involving both data reduction and interpreting words specific to the problems of a particular institution. The study will result in a written report or technical memorandum. This emphasis on documentation is important, and represents the point of view that research which is not systematically reported is no research at all.

The survey of institutional studies in Maryland was conducted in late March and early April 1972. Its focus was on the nature and volume of institutional studies that were recent and current, as defined by a beginning date of January 1, 1971. One foreseeable use of the study was the generation of information for top administration, faculty members, and state officials revealing institutional research capability in terms of reports actually produced.

Six practical types of study frequently mentioned in the research literature were listed on a questionnaire under four categories. These categories, suggested by Marvin Peterson at the 1971 annual meeting of the Association for Institutional Research, were: (a) policy and planning studies, (b) operations research or housekeeping studies, (c) evaluation or outcomes studies (all academic), and (d) descriptive studies of faculty, students, or the institutional dollar.

Within this conceptual framework, those responding were also asked to indicate the degree to which each type of study was initiated by an institutional research unit; the relative advocacy in presenting findings, instead of letting the facts speak for themselves; and whether studies in a given category were usually effective in influencing decisions made.

Of 16 questionnaires distributed, nearly all were returned completed or later completed during a telephone follow-up. Thus, the response was 100 percent.

Table 1 ranks the frequency of exemplary studies reported by institutions within each of the following categories: policy, operation, evaluation, and description.

One approach to institutional research classifies *studies produced* in four ways. These are listed in the table, together with six concrete types of reports that may exemplify each. Within the categories, types are ranked according to frequency of mention by Maryland community colleges as being recent or current (undertaken since January 1, 1971). Number of institutions reporting a study, such as long-range planning, is given in parentheses and is summarized below.

TABLE 1

Institutional Studies by Type: Public Community Colleges in Maryland

Type of Study

A. Policy Studies

1. Institutional long-range plan (15).
2. Analysis of economic and/or social conditions affecting institution (11).
3. Institutional goal-setting (9).
4. Inter-institutional comparisons and/or cooperation (8).
5. Organizational structure and/or functioning (7).
6. Management by Objectives (3).

B. Operational Relationships

1. Enrollment projections, or enrollment sources (16).
2. Space utilization and/or needs (14).
3. Strategies to increase income or effective funds utilization (9).
4. Planning near term alternatives for program development or resource allocation (8).
5. Cost-effectiveness studies (6).
6. Devising simulation models of institutional dynamics (1).

C. Outcomes or Evaluation Studies

1. Program or curriculum evaluation (Individual Curricula) (14).
2. Student success or failure (13). (Academic achievement)
3. Student follow-up studies (12).
4. Academic accreditation or multiprogram mission achievement (8).
5. Teaching effectiveness (7).
6. Effectiveness of media, materials, or methods (5).

D. Descriptive Studies

1. Student characteristics profiles (15).
2. Faculty characteristics, faculty load, student-teacher ratio, or class size studies (14).
3. Salary/fringe benefit studies (13).
4. Descriptions of applications, attrition, graduations, or the equivalent (12).
5. Information supporting the budgeting process (10).
6. Opinion samplings (9).

Under policy studies, practically all the participating colleges reported long-range planning studies. Three out of four were evaluating the social or economic environment in some way. Roughly half were doing studies involving goal-setting, organizational structure, or inter-institutional comparisons. Fewer than one in five were applying the Management by Objectives system.

Institutional housekeeping or "operations research" studies was the second category listed. Practically all the colleges were doing facilities studies, and all were doing enrollment projection work. Nearly half were doing three other kinds of operational studies such as cost-effectiveness, short-term planning, and balancing the budget. Only one community college was doing a simulation study.

Three examples of evaluation studies were reported by a majority of the colleges: curriculum evaluation, student achievement, and follow-up studies. About half of the colleges had studies concerned with total systems evaluation or teaching effectiveness. Fewer than one in three were evaluating media or methods.

It had been anticipated that many institutional studies would be concerned with simple relationships describing students, faculty, or the institutional dollar. This expectation was borne out, as a strong majority of the colleges were found to be doing student profiles, student flow studies, faculty descriptions, or salary studies. Also generating reports at more than half of the community colleges were backup for the current budget and opinion samplings.

The mean total number of studies completed since January 1, 1971, for all community colleges was 24.06, with a standard deviation of 16.94. From preliminary information in other survey results that remain to be analyzed more fully, this was taken to be a relatively high rate of output. More will be reported on national norms at a later date.

When percentage distribution of studies was the criterion, descriptive studies, operational studies, evaluation studies, and policy studies claimed institutional researcher attention. Table 2 shows the mean percentage of studies within each of these categories for all community colleges in Maryland. On the average, one-third of the studies were descriptive. Approximately one-fourth were operational, and nearly a fourth evaluative. Policy studies accounted for the remaining 16 percent of all studies. When the *coefficient of variation* (ratio of the standard deviation to the mean) was to measure relative dispersion, it was found that descriptive studies had a coefficient of about 40 percent, while all the other types of studies had a coefficient at or above 68 percent. This indicates considerably less variability in the proportion of descriptive studies being conducted in Maryland's community college system.

Respondents were asked to indicate for each category of study whether initiative from an institutional research unit was usual, whether an advocacy position was usual (conclusions explicitly related to interest groups likely to be affected by decisions), and whether the category of study was usually effective in influencing decisions made. The opportunity to report non-effectiveness was intended to be a chance to "bellyache" about efforts leading only to File 13, or the shelving of reports. Non-effectiveness that something could be done was a critical focus of interest, although the item was worded positively.

As shown in Table 3, Operational studies and descriptive studies were reported to be generally effective in influencing decisions at most institutions. Operational and descriptive studies were also more strongly associated with advocacy and institutional research initiative. Perhaps one reason why evaluation studies were only 50 percent effective, was the sensitivity of evaluation in relation to people. There appears to be a need to learn how to evaluate effectively but unthreateningly, promoting, for example, the evaluation of teachers by their peers on the basis of what is observable. Institutional research initiative was reported usually for policy studies at one college in three, about the same as for evaluation studies. The generalization can be made that orders for a planning or policy study most frequently come from elsewhere, usually from the administration or the trustees; neutrality is usually observed in interpreting the results.

The date concerned with initiative, advocacy, and effectiveness for all studies indicated that at nine out of ten institutions, institutional studies were felt to be effective. Institutional research initiative was apparent at two-thirds of colleges, indicating considerable freedom to look at problems affecting a particular institution. Often, advocacy was usual in interpreting findings, indicating a willingness to be accountable for recommendations made. The picture was one of dealing openly with interest groups likely to be affected by

TABLE 2

Mean Percentage of Different Types of Study for Public Community Colleges in Maryland*

	Mean	Standard Deviation
Percentage of Policy Studies	16.00	11.59
Percentage of Evaluation Studies	23.13	15.67
Percentage of Operational Studies	27.75	19.03
Percentage of Descriptive Studies	32.44	12.89

*April 20, 1972

TABLE 3

Percentage of All Institutions Reporting Typical Institutional Research Initiative, Advocacy, and Effectiveness of Studies by Type of Study*

	I.R. Initiative Usual	Advocacy Position Usual	Usually Effective in Decision-making
Policy Studies	19%	38%	69%
Evaluation Studies	44	38	50
Operational Studies	63	56	100
Descriptive Studies	75	44	81
All Studies	69%	56%	88%

*April 20, 1972

decisions.

If Maryland's patterns are general, it may be worth asking how institutional researchers can work together to increase institutional research initiative, advocacy, and effectiveness in doing policy and evaluation studies. Alternatively, the survey results may mean that a strategy is being practiced whereby sensitive policy and evaluation studies are not being done unless there is an expressed need for them. Hard work may be desired to cultivate this need, or to organize information in advance so that it will be ready when the need arises. It seems reasonable to conclude that an important direction of growth open to institutional research in Maryland is in the area of techniques for policy and evaluation studies. It is open to discussion whether Maryland is unique in this respect.

OBJECTIVES – GOALS – MISSIONS
AN INSTITUTION'S DIRECTIONAL STATEMENT FOR MANAGEMENT AND PLANNING

J. Stanley Laughlin
Kansas State Teachers College
and
Gary D. Chamberlin
Arkansas Department of Higher Education

For many years, educators found themselves in the role of knowledge transmission to students with little interference from parents, students, or the public-at-large. During this period of time, higher education was recognized as the primary means for attaining economic security and social mobility, while at the same time increased security induced more people to seek educational attainment purely as a means for expanding individual knowledge. The dramatic increase in sheer numbers of students and the ready availability of monies caused higher educational institutions to grow and expand in both physical facilities and curricular offerings. The general psychology surrounding colleges and universities was that to grow and expand was a way of life which would continue indefinitely and that such growth and expansion was an indication that an institution was dynamic and "good." There was little demand for self-evaluation and little time available for harried administrators and overloaded faculty members to engage in such evaluation.

In recent years, however, the enrollment increases have begun to level, the job market for college graduates has softened, the public acceptance of additional taxation to support educational efforts has waned, and the general love affair between higher education and the public has begun to diminish. We now see an attitude in which there is some question about whether a particular student should attend college or pursue another occupational goal, whether monies invested in higher education are producing the maximum in results, or whether the institutions are responsive to human needs; and the word "accountability" has begun to be bantered about frequently.

As this cooling period has emerged, it is not an unpopular opinion that much "fat" has built up in administrative structure, in academic structure, and in curricular patterns. Evidence provided by federal and state legislative activities, news media reports, and public statements leaves little doubt that higher educational institutions now need to engage in considerable self-introspection and to reassess whether it is feasible to be "all things to all people". Many educators, such as Dressel,[1] Lawrence,[2] and Millett,[3] have recognized the need for improved institutional planning and have pointed out that a clearly defined and well disseminated institutional plan is at the very base of responsible and effective institutional management.

Undergirding institutional planning, however, is the establishment of institutional missions, goals, and objectives in measurable terms. It is not rare for an administrator to learn that there are several different views of the mission of his institution. In the absence of a clearly stated mission, the views held by students, parents, faculty, business and industry, and a host of other elements may be totally different.

The task of establishing an institutional plan is complicated by the fact that the process must involve many people who may, or may not, be oriented toward such developments. The purpose of this presentation is to establish a framework or state-of-mind for engaging in institutional goal-setting.

BASIC CONCEPTS

The United States Office of Education has defined institutional need as:

Goals – Present Status = Need.

It becomes necessary for an institution not only to isolate goals but to determine the present status of goals in order to arrive at needs. It further follows that such goals must be stated in specific measurable form if the extent to which a goal is being met can be determined.

Certainly there are, and always will be, personnel in higher education that function at the abstract rhetoric level and will actively resist specific measurable statements. Further, there may always be statements which appear to evade evaluation when they are accepted without refinement, *e.g.*, "Is higher education really necessary?" or "Is the public getting what it pays for in higher education?" Nevertheless, there is an urgent need for sets of statements which are rather specific in nature regarding missions-goals-objectives. Much time has been spent writing general statements that are called missions or goals or objectives. However, these efforts are only the first of many steps needed before operation or evaluation can be clearly employed.

PLANNING STRUCTURE

In order to develop objective and goal statements, a systematic procedure must be established. For a visual illustration of the procedure herein employed, refer to the directional statement of missions-goals-objectives in Figure 1. Working from the left hand margin to the right, observe the development that emerges.

First, certain comments regarding mission statements are needed. These statements are usually very broad identifying only what elements or directions are desired and do not state who are the benefactors. Mission statements are needed as a starting point, particularly for the highly verbalistic person who, when confronted with more specificity, becomes non-directed. The general mission statement may also be adequate for publics who do not need specifics, such as students wanting to know what the college offers. This mission statement will be called the construction variable. The second step is the isolation of more specific general goals from the mission statements. In this step, it is logical to isolate the benefactors for whom the direction is intended in the mission and this we call the benefactor variable identifying the group that will benefit from the stimulus or process. Degree

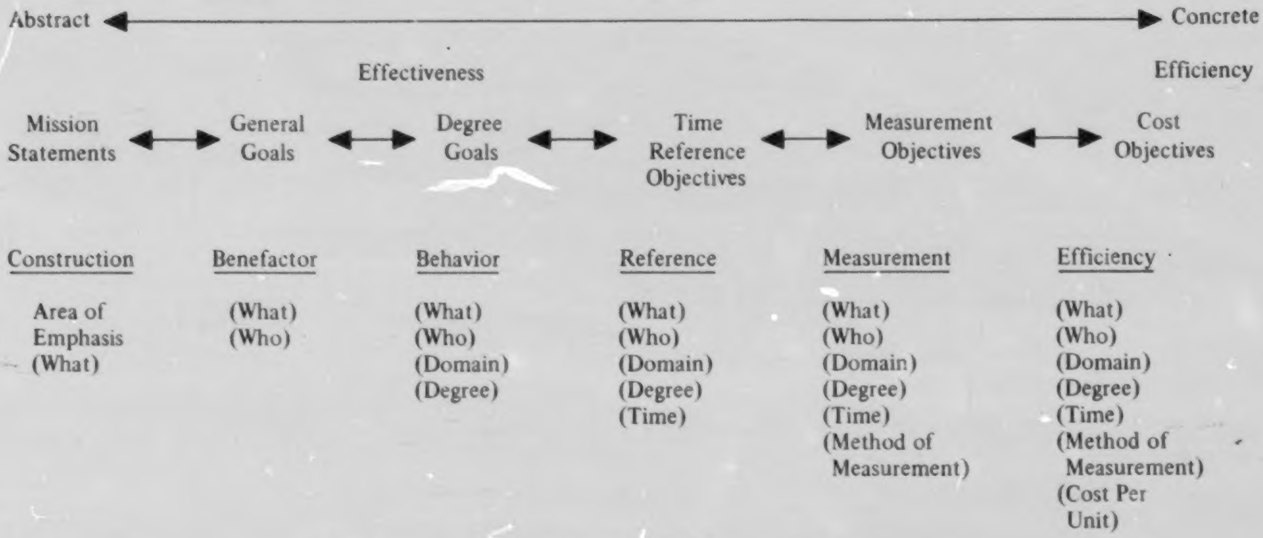
Abstract
Concrete
Effectiveness
Efficiency
Mission Statements
General Goals
Degree Goals
Time Reference Objectives
Measurement Objectives
Cost Objectives
Construction
Area of Emphasis (What)
Benefactor
(What) (Who)
Behavior
(What) (Who) (Domain) (Degree)
Reference
(What) (Who) (Domain) (Degree) (Time)
Measurement
(What) (Who) (Domain) (Degree) (Time) (Method of Measurement)
Efficiency
(What) (Who) (Domain) (Degree) (Time) (Method of Measurement) (Cost Per Unit)

Figure 1: Directional Statement of Mission – Goals – Objectives

goals would be the next level of analysis. This step would add the domain of learning and the level of performance that would be acceptable for success and would be called the behavior variable identification. Realizing that time is indeed important when writing missions and goals, the next subdivision would be the writing of time reference objectives. This would reference the time span considered in the objective; one year, time to receive a degree, students to be served in one year or four years, to mention a few examples. The next level of subdivision would be the measurement objective. Here the methods of measurement would be added to the aforementioned stages and would identify how and when measurement would be applied.

These five steps are an attempt to move from the abstract to the concrete and are basically the effectiveness variables. Once at this point of writing statements, one would know what direction is expected, who the benefactors of this direction would be, the learning domain being described, the level of satisfaction expected, the time period over which the stimulus is directed and the method of measurement. The final step would be to include an item for cost analysis or efficiency. Identification of the cost unit based upon effectiveness identifies the cost of the desired outcome.

To aid in the identification of the sequence for writing more specific statements, a plan of action is devised. The first three steps can be conceptualized by referring to Figure 2. Considering a three dimensional model, the mission statement is the construction variable, identifying the direction of "what." The benefactor variable relates to the general goal of identifying the "who," (the people to whom direction is projected) and the behavior variable is the learning domain at which the stimuli are directed. The directional statement and the variable identification figure can be employed at a state level, at an institutional level or at a classroom instructional level and further used in subdividing the mission into operational statements which contain greater specificity. In addition, the variable identification figure can be utilized by subdividing the mission of the total state or institution into subunits within the organization. That is, the mission may be generated at the highest administrative level and more specificity obtained at the school or college level with further detail developed at the department level. Even greater specificity in the form of behavior performance of the benefactor could be obtained at the instructional level.

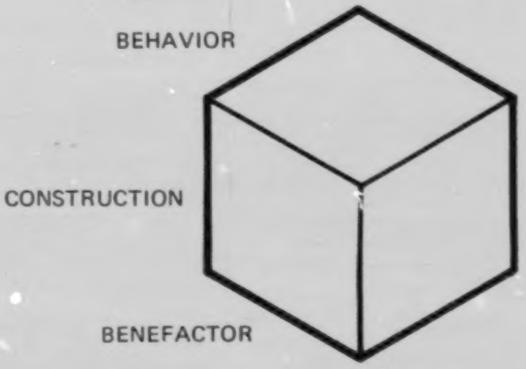
BEHAVIOR
CONSTRUCTION
BENEFACTOR

Figure 2: Mission Illustration (Institutional Level): Variable Identification

To illustrate the subdivision of statements, Figures 2, 3, 4, and 5 show such a development in another way. These

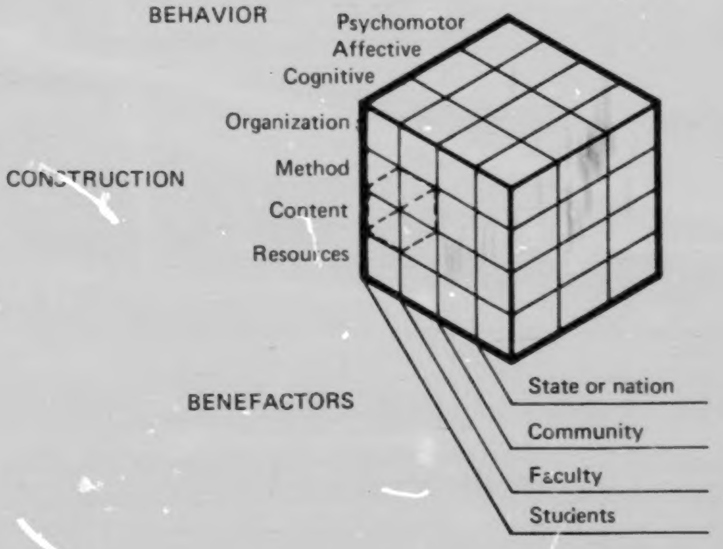
BEHAVIOR
Psychomotor
Affective
Cognitive
Organization
CONSTRUCTION
Method
Content
Resources
BENEFACTORS
State or nation
Community
Faculty
Students

Figure 3: Goal Illustration (College or School Level)

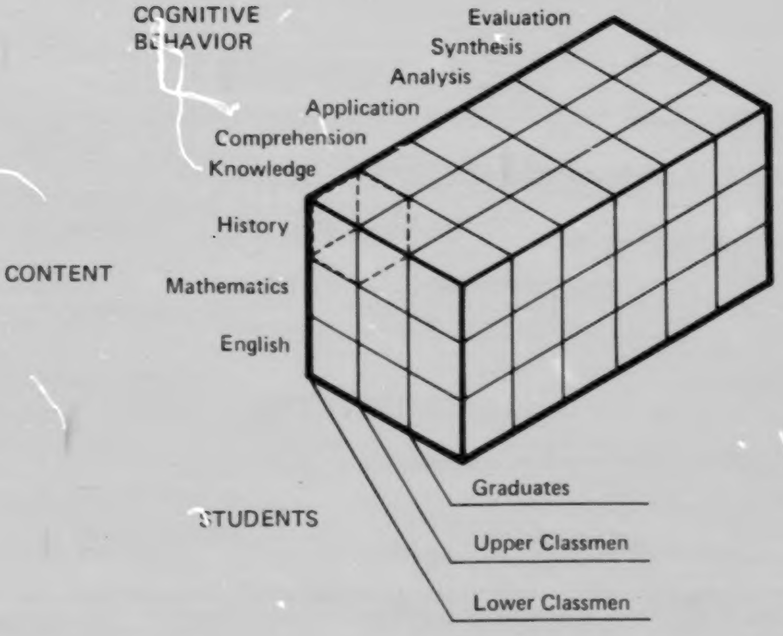
COGNITIVE
BEHAVIOR
Evaluation
Synthesis
Analysis
Application
Comprehension
Knowledge
History
CONTENT
Mathematics
English
STUDENTS
Graduates
Upper Classmen
Lower Classmen

Figure 4: Objective Illustration (Departmental Level)

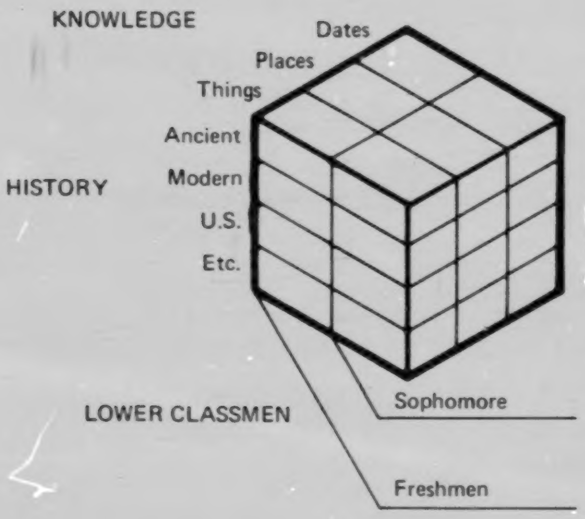

Figure 5: Further Subdivision Objective (Class Level)

three dimensional figures attempt to show how a continuous analysis of ideas can be developed to identify the specifics needed in goal and objective development. Three variables are identified: one, the benefactors of the college outcomes; two, the behavior desired as outcomes; and three, the construction variable or the resources available in seeking desired outcomes. Figure 3 illustrates how each of these three variables can be subdivided into separate components so that additional specificity can be identified. If it is desirable to discuss majors for undergraduate students and to assess their knowledge of the major, one could center upon the cell outlined by the dotted lines in Figure 3 and further subdivide that block into Figure 4. Proceeding with the subdivision, suppose one wanted to consider the writing of an objective regarding only history content knowledge of lower level undergraduate students. Again, a further breakdown of the dotted cell in Figure 4 could be arranged as in Figure 5.

An attempt has been made to devise a framework of how each specific item within a college or university could be subdivided as a workable identifiable entity, carefully isolated, examined and studied. The structure built herein is hierarchical in that an institution could begin by building a mission statement, then, from that statement, build institution wide goals. Further, the specific schools or colleges within universities could subdivide those goals so that objectives and other goals at a lower level could be obtained. The process could be continued to the specific instructional level within each classroom session and similarly applied within research and public service areas.

DISCUSSION AND SUMMARY

Although not envisioned as the only satisfactory method for institutional planning, this structure is seen as a basic framework which, if applied conscientiously, could make the task of goal-setting develop in an organized manner. It could even be utilized by a state agency in coordinating efforts at that level to identify the directions of each institution. The main consideration of many state units has been to establish more precisely a coordinated effort from the topmost administrative level of the state, usually the governor, to the level of instruction within the classroom. The desire is for each group within the hierarchy to more clearly understand the direction for management, whether it be students, faculty, administration, trustees, boards, or legislators.

The use of a structure such as the one outlined is a matter of coordinating people. Various people should be involved and cognizant of the statements to better understand the direction of the administrative unit just above their own, whether at the state, institutional, school or college, departmental or instructional level.

There are those individuals who immediately conclude that such a framework is too structured and that the identification of outcomes and attaching a cost factor on outcomes is stretching the point much too far. Others see it as a minimizing control which is not elastic enough to provide for changes in directional desires. Flexibility is, indeed, a virtue needed in higher education. However, if additional effort would be expended to identify a more detailed structure of statements as outlined, it is contended that institutional homogenization would, in fact, be slowly reversed. Today we have institutions which strive to perform very similar missions, rather than heterogeneous missions.

What has been conveyed herein is that a great deal of work is yet to be accomplished on stating missions-goals-objectives. Educational leadership must accept the challenge, however, to assure that future educational decisions and directions are determined by sound management and planning practices rather than on the basis of political expediency.

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1. Dressel *et al, Institutional Research in the University* (San Francisco: Jossey-Bass, Inc., 1971).
2. B. Lawrence, D. Curry, J. Eden and G. Weathersby, "Data Comparability in Higher Education," National Center for Higher Education Management Systems at WICHE, Coulder, Colorado, September 15, 1971.
3. J. Millett, *Decision Making and Administration in Higher Education* (Richmond, Virginia: The William Byrd Press, 1968).

THE DELPHI TECHNIQUE MODIFIED FOR ESTABLISHING INSTITUTIONAL PRIORITIES AS A PREREQUISITE TO RESOURCE ALLOCATION

Robert J. Parden
University of Santa Clara

INTRODUCTION

Many of today's discussions in higher education focus on how to do more with less and, thus, there is a search for answers to a number of related questions: (a) What are the institution's objectives and goals, and their priorities? (b) What are the various ways these goals can be satisfied? (c) What resources will be available? (d) What is the optimum match of goals and resources? (e) How does this match with current activities? (f) What changes have to be made? Developing answers to these questions requires comprehensive institutional planning – the planning of change. This paper focuses on the first step – the identification of objectives and goals and their priorities through a modification of the Delphi method.

IDENTIFYING INSTITUTIONAL GOALS

A precise statement of, and the ranking of institutional goals is required for several tasks:

a. To identify purpose and describe direction so that the contribution of members of the organization is cumulative;
b. To provide criteria for the allocation of scarce resources;
c. To identify a level of achievement against which institutional progress can be measured.

When a goal inventory is completed, not only should it provide a priority ranking as perceived by those who contribute to the consensus, but the individual statements should describe the action that should be taken. For example, "To expand enrollment" is a short term objective. It becomes a goal when it is precise and describes an action: "To reach an undergraduate FTE enrollment of 4000 by 1976, adding 100 additional freshmen each year."

THE SANTA CLARA PROJECT

At Santa Clara, the pressures for a precise statement of goals developed in two areas: the universal dilemma of rising costs and plateaued income; and the question of university governance and institutional priorities. A University Community Council including faculty, students, and administrators had been formed. Where the university was going and whose needs were to be satisfied first required a ranking of goals to precede resource allocation. At the first meeting of the new University Community Council, the agenda quickly moved to a debate on the sequence in which proposed new buildings would be erected. This need for additional facilities, of course, related to university programs and their priorities. It was anticipated that considerable time would be required for each of the thirty six members to express their opinions and debate the alternatives. There was a need for a mechanism to develop a ranking of goals in an orderly fashion. The Delphi Technique offers this potential.

THE DELPHI TECHNIQUE

This procedure was developed by the Rand Corporation[1] to facilitate the achievement of group consensus. The initial Delphi project solicited the opinions of experts about when they thought future technological achievements might occur. The procedure therefore seeks to achieve a consensus by soliciting the opinions of individuals in writing, anonymously, with each round of responses circulated to the other members of the group to be studied at their leisure. When individual positions no longer move towards consensus, the inquiry ceases. The technique was developed:

a. To reduce the tendency of high ranked members of the group to intimidate the others and inhibit valuable exchange;
b. To allow leisurely consideration of proposals and counter proposals, written evidence, and arguments which the dynamics of group meetings shroud in words and noise;
c. The Delphi procedure allows persons to switch positions based on the logic of the arguments without "losing face" by appearing indecisive because of a premature judgement.

This paper and pencil technique might hopefully reduce "shared impressions" by those who participate in many university committees without doing research or reading papers circulated in support of agenda items.

THE INVENTORY DESIGN

The "classical" Delphi method (classical referring to the initial effort in contrast to a variety of subsequent modifications) was open-ended – the dates for future events were requested without guidelines. It was not thought that the thirty-six members of the Santa Clara Community Council had the time to develop their own list of potential university goals unassisted. Two existing instruments were considered for possible use: "The Institutional Goals Inventory", developed by the Educational Testing Service,[2] and the Gross and Grambsch study.[3] It was judged that goals in these were too broadly stated to be of value in resource allocation.

It was decided to prepare a comprehensive list of "typical" university goals which could be extracted from other institutional studies, a list which could be expanded with the goals perceived by the local participants. The development of a list of typical college and university goals was much accelerated by Ladd's report of eleven college and university self studies.[4] The following is a number of items composing one page from the Santa Clara Inventory, the first survey instrument using this listing of typical goals.

Santa Clara should:

19. . . identify an experimental college, operated by an elected board, within the financial constraints the enrollment suggests. This unit would be free for total experimentation, and could be a source of curricula innovation and relevance to today's student interests.

20. . . seek year around operation by initially subsidizing a summer quarter which would seek national enrollments. It would be a major financial bonanza to Santa Clara to provide more summer income.

21. . . use its scholarship funds to attract students who have won California state scholarships, and not support those who did not. This is the caliber of students Santa Clara seeks, and this is the best use of limited resources.

22. . . establish some "pinnacles of excellence," singling out for additional support some departments who have already gained momentum. The University lacks the resources to advance on a broad front. Visibility in selected areas will provide a "halo" effect for the entire institution.

23. . . establish admissions quotas for freshmen and transfers by majors. It is uneconomical to add a second section in an upper division major area for a student who is admitted in preference to an applicant for an undersubscribed major – within reasonable limits of academic quality.

24. . . carefully consider the recommendation of the Carnegie Commission to create a 3-year bachelor's program. Support should be given to a task force to visit other schools who are in the implementation stage to develop costs, potential benefits, requirements, and implementation schedules.

Initially, two interest scales were considered for each goal in the "is" and "should be" style of Gross and Grambsch. One scale identifies whether or not the particular goal is of consequence. The second response scale, for the same item, asks whether or not that goal is perceived as a highly desirable one. For the sake of simplicity, however, it was decided to use a single scale, with values of 5 (very important), 4, 3, 2 and 1 (no importance).

SANTA CLARA GOAL INVENTORIES

Anonymity was preserved, though respondents were asked to identify themselves as students, faculty, or administrators so that polarity could be studied. The first survey included 53 goals. Twenty-eight additional goals were proposed by those who participated in the first ranking. Twenty-four of the 53 goals listed in the first inventory were identified as either highly desirable or as not important. There was no consensus recorded for the remaining 29. These 29, together with the 28 newly proposed goals, composed the second solicitation. Room was provided on the response sheet for the rater to offer a two-line comment, especially if he chooses a 5 (very important), or a 1 (no importance) rating. This comment was then to be shared for subsequent rankings. Further solicitations were not scheduled for this group when it appeared that an additional survey would not contribute to a further convergence. Table 1 includes a rank order listing of the goals perceived as most important, and of least importance, by this group after two ratings.

PROJECT EVALUATION

What have we learned as a result of this project?

a. The total time involved in obtaining this ranking of goals is considerably less than if the list had been developed in an open forum.
b. Despite this savings in time, there appears to be a limit to the amount of time individuals will spend in completing any single inventory. The prolonged concentration is fatiguing and to students it resembles another final examination. To obtain the greatest participation, therefore, items should be limited to those of immediate significance.
c. This procedure does produce the top to bottom ranking of institutional goals as perceived by those who participate in the procedure. The information is available in support of resource allocation decisions. It suggests tasks to be undertaken for everyone.
d. The ranking procedure might be improved by a general training session in which each goal is examined. This would not be a time for debating priorities, but would attempt to increase the expertise of the participants.
e. The procedure quickly identifies areas in which there is no general interest. Highly vocal supporters of specific programs often shield the true level of community interest.
f. Polarization among students, faculty, and administration is considerably less than expected.
g. There is need for considerably more research about the technique, including the development of inventories, item analysis, scale refinement, single session optimum time inquiries, intervals between solicitations, and similar experimental concerns.
h. It can reduce the number of committee meetings.

TABLE 1

University of Santa Clara Goal Rankings After Two Reiterations

Rating out of 5	
	Important
4.7	Abolish a number of non-teaching positions
4.21	Increase the resource allocation for instruction
4.1	Evaluate internal costs and operating effectiveness
3.93	Develop more sophisticated methods to identity superior teaching
3.9	Achieve identification as *the* small, selective Catholic university
3.8	Develop a coordinated program for budget review
3.8	Develop endowment to cover operating deficits

3.8	Develop an administration-student communication of major policies
3.79	Seek a more viable confrontation in religion
3.71	Expand faculty recruitment to get the best candidates
3.71	Restrict athletic expense
3.71	Study the Mundt plan: large lectures, small tutorials
3.7	Restrict physical plant expenses
3.7	Develop a financially feasible distribution of faculty rank
3.7	Provide a September orientation for new faculty and administrators
3.64	Carefully consider a 3-year B.S. degree program
3.64	Restrict expenditures in general administration
3.64	Expand the placement activity to encourage alumni use
3.6	Expand opportunities for field study
3.6	Provide more secretarial help for faculty
3.57	Evaluate a variety of meal plans for students
3.57	Express Santa Clara's religious outlook so as to challenge America's secular values
3.50	Restrict general institutional expense
3.50	Support visiting professors
3.50	Appoint a faculty member to encourage non-lecture forms
3.50	Appoint a faculty coordinator for academic counseling
3.50	Use faculty in the Fall for student recruiting

Of Little Importance

2.21	Implement a living-learning dormitory experiment
2.20	Reduce services in order to prevent rapid tuition increases
2.20	Increase support of the present counseling center
2.14	Develop a "cluster" college structure
2.1	Encourage faculty and student participation in governance
2.0	Combine the departments of religious studies and philosophy
2.0	Establish a university-wide governing board
1.9	Establish a San Francisco center
1.71	Restrict library expense
1.4	Devote more of its resources to the needs of graduate students

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1. Norman Dalkey and Olaf Helmer, "An Experimental Application of the Delphi Method to the Use of Experts," RM-727-PR, 1969; Olaf Helmer, "The Use of the Delphi Technique in Problems of Educational Innovation," 1966, p-3499; and N. C. Dalkey, "The Delphi Method: An Experimental Study of Group Opinion," The RAND Corporation, Santa Monica, California, 1969.

2. Educational Testing Services, College Entrance Examination Board, Box 592, Princeton, New Jersey 08540.

3. Edward Gross and Paul V. Grambsch, *University Goals and Academic Power* (Washington, D.C.: American Council on Education, 1968).

4. Dwight R. Ladd, *Change in Educational Policy* (New York: McGraw-Hill, 1970).

METHOD AND MEANING IN FACULTY ACTIVITY ANALYSIS

E. G. Bogue
Memphis State University

INTRODUCTION

A concern for more effective allocation and utilization of higher education resources has led many institutions to use faculty activity analysis as a prime tool of academic personnel management. Though many institutions have made use of faculty activity analysis for a number of years, attitudes on the merit of both product and process are by no means united.

Located at one end of the attitude continuum are those who feel that the data extracted from service reports of time and effort distribution are both meaningless and unreliable. They point out that most faculty activity studies do not address the important variable of quality; therefore, we should not burden or "pester" the faculty by asking them how they expend their time and effort – especially since faculty members do not know what they do with their time.

A contrasting attitude posture was neatly captured by another academic administrator who responded that his:

> . . . institution's posture could never include any intimation that faculty members do not know what they do with their time. They know all right. They just would never stand still for any administrative inquiry into what they do![1]

Proponents of this point of view insist that faculty activity studies encourage both individual faculty and academic administrators to engage in beneficial introspection concerning the distribution of faculty resources.

In the past decade, at least three major conceptual references concerning both philosophical and procedural issues have appeared. These include the 1961 ACE report by John Stecklein entitled *How to Measure Faculty Workload,*[2] the 1965 NSF report coordinated by R. J. Henle and entitled *Systems for Measuring and Reporting the Resources and Activities of Colleges and Universities,*[3] and the 1971 NCHEMS Technical Report No. 24 on *Faculty Activity Analysis: Overview and Major Issues.*[4]

To borrow a phrase from the NCHEMS report,[5] the study of faculty activity analysis has a long and uneasy history. To what extent are colleges and universities making use of the concepts outlined in these and other references? This paper reports the findings of a stratified sampling (by enrollment) of institutions throughout the nation in which questions of both philosophy and procedure were explored. Findings outlined here may provide a base of information against which academic administrators might display their own policy and practice. An analysis of the data received from 433 out of the 570 institutions surveyed permits us to:

(1) Develop a profile of those institutions making use of faculty activity analysis and to explore reasons for using and not using this kind of analysis.

(2) Explore some of the procedural trends and practices in the administration of faculty activity analysis programs.

A PROFILE OF FACULTY ACTIVITY USAGE PATTERNS

How are the attitude variances outlined reflected in the usage patterns among institutions? The data of Figure 1 indicate that:

(1) Use of faculty activity analysis (FAA) is about twice as prevalent among public institutions as compared to private institutions (49% of all public institutions have an FAA program as compared to 24% of all private institutions.)

(2) Use of FAA is more prevalent for the larger, more complex institutions than for the smaller institution.

At least part of the ferment in the use of FAA can be associated with the current call to accountability. The increased external interest of coordinating boards and legislatures in the affairs of faculty workloads is most probably reflected in the larger portion of public institutions now using faculty activity analysis. In addition, 50% of the public institutions now using faculty activity analysis indicated that the principal incentive for first use came from external source – coordinating board, or legislature. Finally, approximately 75% of institutions using faculty activity analysis indicate they made their first move in this direction within the last five years.

The profile of current usage indicates, then, that the probability of finding a faculty activity analysis program is greatest among larger publicly controlled institutions. An assumption having at least some validity would be that this high use pattern among public institutions is encouraged by the current accountability mood in higher education, and accented by relatively austere economic conditions and more visible external interest of coordinating boards and state legislatures. Let us have a closer look at this external interest as we examine trends in the administration of faculty activity analysis programs.

THE EXTERNAL INTEREST

If you read such publications as the *Higher Education Chronicle* or *Higher Education and National Affairs* and are in touch with colleagues over the country, then you cannot escape the heightened and specific interest among governmental bodies in the utilization of faculty resources. The

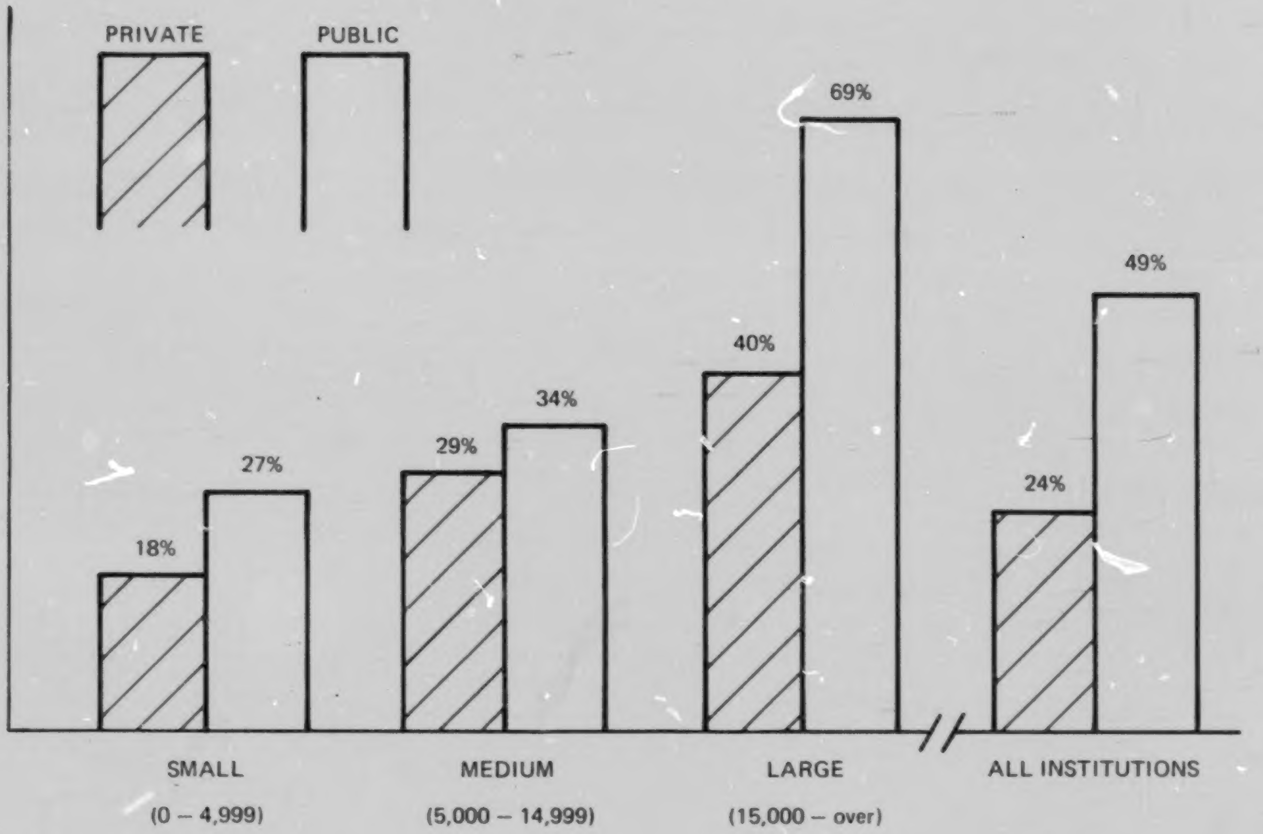


Figure 1: Use of Faculty Activity Analysis as a Function of Enrollment and Control

current state of interest is clearly captured in Figure 2, which shows that 7 states have adopted a statement of minimum workload standards for all public institutions, and 22 states also require the submission of a faculty effort report on either a recurring or periodic basis.

In some states the report requires only an outline of teaching loads and distribution of time/effort. In other states the reporting requirements are much more specific; and the administrative burden of defining and reporting course load equivalents appears formidable. In reading over some of the reporting requirements in these states, one finds them alternatively depressing and informative, depressing in the administrative effort required at all levels, and informative in the way in which some states have attempted to define course or teaching equivalents for such activities as independent studies, advising, large lectures, etc.

As I began work on this paper and more particularly on this section concerning external interests, I could approach the topic with some degree of academic detachment. However, my detachment was short lived, as the Tennessee State Legislature passed a resolution this spring asking that the Tennessee Higher Education Commission study faculty workload standards in public institutions and present a report and recommendations to the next session of the Legislature, which will convene next January. I can report that the resolution was a relatively "friendly" one, rather than constrictive or vindictive, and that it was sponsored by men whom I would describe as friends of higher education in Tennessee. Their interest is sustained by a healthy concern for quality education over the entire state, and those of us serving on the Advisory Committee to the Higher Education Commission see this study as an opportunity for a sharing of perspectives.

DATA ACQUISITION

The procedural issues surrounding the acquisition of data have been reasonably well defined, especially in the NCHEMS report previously cited. In terms of effort measurement, there is a spread of practice involving the use of (1) clock or contact hours, (2) percentage of time/effort, (3) course or teaching load equivalents or some combination of these three.

Service reports illustrating these approaches include Louisiana State University (average hours per week), West Virginia State University (percentage of effort), University

State	Minimum Workload Standard				Submission of Faculty Effort Report		
	No	Yes, Adopted In			No	Yes, Report is	
		1960	1960-66	1966-		Recurring	Period.
Ala.	x				x		
Alaska				x	x		
Ariz.	x				x		
Ark.	x						x
*Calif.		x					x
Colo.	x					x	
Conn.	x				x		
Fla.				x	x		
Ga.	x					x	
Hawaii			x		x		
Idaho	x					x	
Illinois	x					x	
Iowa	x					x	
Kansas	x				x		
Ky.	x				x		
La.	x						x
Md.	x				x		
Mass.							
Mich.				x			x
Minn.	x				x		
Miss.	x				x		
Mo.	x						x
Mont.	x						x
Nevada	x				x		
N. H.	x				x		
N. J.				x			x
N. M.	x				x		
N. Y.	x				x		
N. C.	x				x		
N. D.	x					x	
Ohio			x			x	
Okla.	x				x		
Oregon	x					x	
Penn.	x				x		
R. I.	x				x		
S. C.	x					x	
S. D.	x					x	
*Tenn.			x				x
Texas	x					x	
Utah	x				x		
Vt.	x				x		
Vir.	x				x		
Wash.				x		x	
W. Vir.	x					x	
Wis.	x						x
Wyo.	x				x		

*Minimum workload applies to state college and university system but not to University of California and University of Tennessee.

Figure 2: Profile of State Level Interest in Workload Standards and Faculty Effort Distribution

	Allocating New Staff	Overload Assignment Compensation	Evaluating Performance For Salary	Definition of Workload Expectations	Encourage Planning	Compare FTE Effort Distribution	Other
Doctorate	3	6	7	7	1	2	5
Masters & Bryond	2	5	6	1	3	4	7
1st Professional Deg.	4	6	1	2	3	5	7
4 or 5 yr. Bacc.	5	4	3	2	1	6	7
2 but less than 4	4	3	7	1	2	5	6
TOTAL	4	5	6	2	1	3	7

Figure 3: Rank Order of Decision Applications for the FAA

of Cincinnati (combined hours and percentage), Memphis State University (teaching or course equivalent).

There is another interesting feature caught in the Memphis State Activity Record that is also found in several other institutions – that of combining a service report with some performance measure. For example, the University of Iowa currently issues a booklet to the faculty which asks for a report of average hours in various program activities, but also provides for recording of honors, scholarly achievements and recognition. At the University of Calgary in Canada, the distribution of faculty effort is secured via means of annual report to the President, the report requiring the entry of specific activity performance as well as time estimates. The simultaneous capture of information related to both activity and accomplishment can be found in a number of current faculty service reports.

DATA APPLICATION

Probably no other feature of faculty activity analysis programs generates more faculty anxiety and conflict than the question of how the data will be used. A concise outline of the possible decision applications of faculty activity data can be found in the NCHEMS report. Figure 3 indicates the rank order priority of decision applications as reported by institutions participating in this study – there being special emphasis on planning, workload definition, and staffing decisions.

Many institutions now generate a variety of individual and group output profiles similar to those shown in Figures 4 through 8. The generation of these and similar tables can provide extended periods of amusement for our computers, and the tables make good stuffing for spiral bound reports. But the data can be put to more serious use as well. Among the possible decision applications of faculty activity data are the following.

Goals – Effort Comparison

Figure 4 is a table extracted from a faculty activity study at the University of Minnesota.[6] Using a table similar in content to this, one new dean found that his faculty reported less than 1% of their effort devoted to research – and most of this was generated in a single department. Since at least one fourth of this college's instructional activity (as measured by credit hour production) was at the master's and doctoral level, the new dean found the apparent absence of research effort of more than passing interest. An examination of faculty performance revealed that the reporting did in fact correspond with reality. The data led to a series of faculty discussions over the role and services of the college.

Goal/effort comparisons are also useful for those standing outside individual institutions. For example, an output profile similar to that shown in Figure 5 (taken from a faculty activity study in Michigan[7]) can be of significant interest to a coordinating board examining the relationship between institutional purpose and resource allocation patterns.

Overload Compensation

In some institutions, the faculty service report becomes an important information element in decisions related to overload compensation (i.e., under what conditions does consulting with the Bureau of Economic Research constitute part of expected load and when is it appropriate to pay for overload). Use of individual profiles similar to that shown in Figure 6 (taken from a faculty activity study at Memphis State University)[8] can aid academic administrators in making these decisions on a more informed base – especially if there are operational equivalents for such activities as advising, large classes, dissertations supervision, etc.

	CLA		IT		IA		CBS		Law		Pharmacy		Education	
Activity	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%
Instruction	36	61	29	52	22	40	22	39	30	52	26	48	32	57
Research, Scholarly and Creative Activities	10	16	16	28	16	30	20	35	10	17	12	22	7	13
Public Service	3	5	2	4	5	8	3	5	3	5	5	9	5	9
Administration	8	14	7	13	10	17	11	19	5	10	8	15	10	18
Other Activities	2	4	1	2	2	5	2	3	9	16	4	6	2	4
*Total	59	100	56	100	55	100	57	100	57	100	55	100	57	100

	Bus. Adm.		Morris		Gen. Col.		Duluth		Crookston		Libraries		Tot. Univ.	
Activity	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%
Instruction	29	51	43	73	42	71	42	71	34	61	3	6	32	56
Research, Scholarly and Creative Activities	12	21	4	8	4	6	5	8	4	6	2	5	10	17
Public Service	3	5	2	3	2	4	2	4	3	6	2	5	3	5
Administration	10	18	8	14	8	14	8	14	9	16	10	20	9	15
Other Activities	3	5	2	3	3	6	2	3	6	10	30	64	3	6
*Total	57	100	58	100	59	100	59	100	56	100	46	100	57	100

*All results are rounded to the nearest whole number; therefore, the sum of each column may differ slightly from the value listed for the Total.

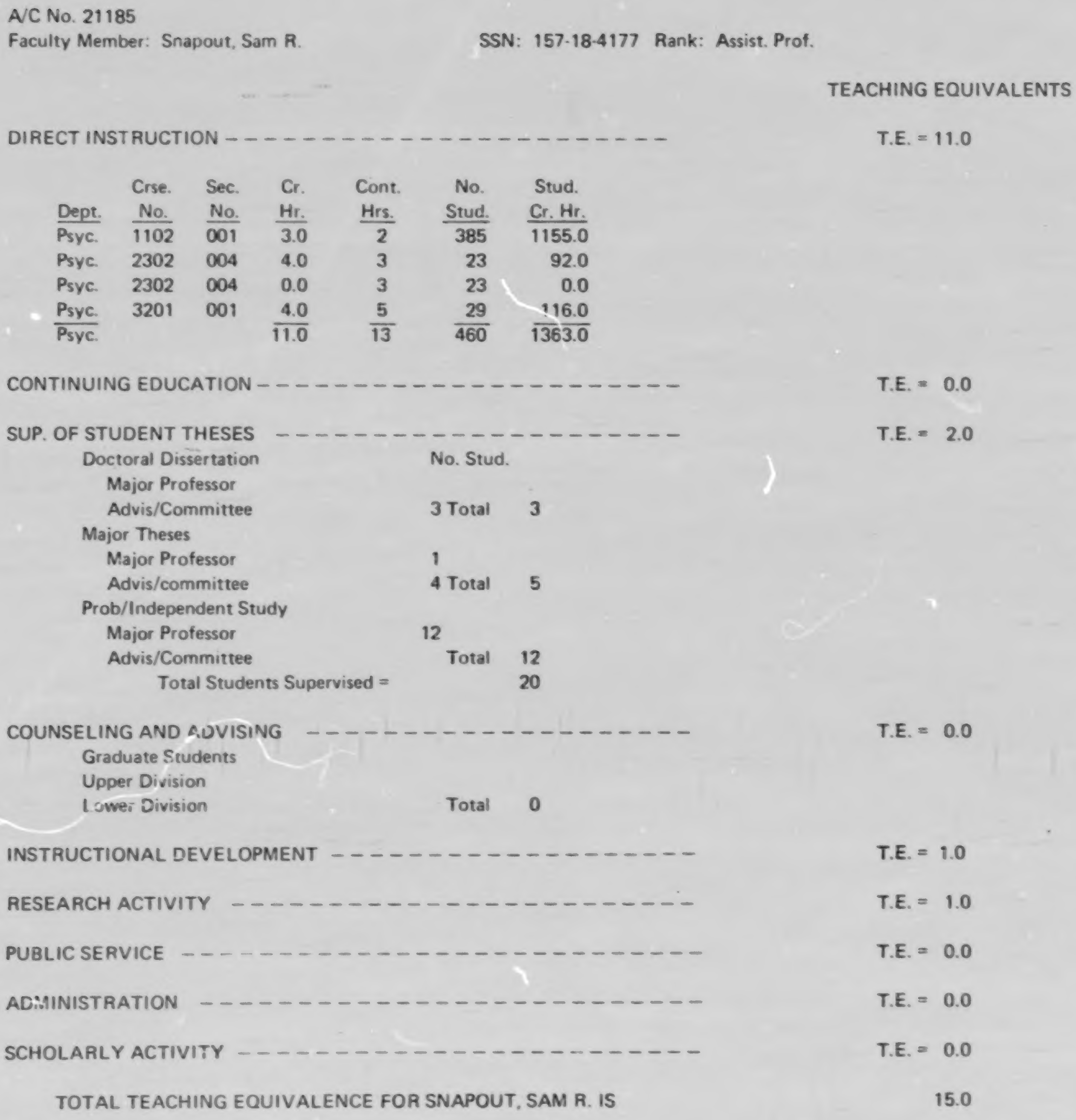
Figure 4: Summary of Full-Time Faculty Activities, University of Minnesota: Mean Hours/Week and Percent Time Devoted to Activities by College

	Instruction		Scholarly &	Professional				Total FTE
Institution	Classroom Instruction	Support Instruction	Creative Activity	Service Activity	Admin. Activity	Committee Assignments	Other	Academic Staff
Central Mich.	268.18	301.47	7.45	.65	18.90	15.30	25.48	637.43
Eastern Mich.	536.72	49.76	76.95	67.50	35.17	26.75	806.06	
Ferris State	150.19	224.09	16.44	4.61	14.12	12.84	6.14	428.43
Grand Valley	44.52	48.34	19.28	7.48	11.04	8.62	3.61	142.89
Lake Superior	21.57	34.47	9.02	3.78	7.85	3.46	2.70	82.75
Michigan State	1763.39	——	316.43	56.85	200.41	——	——	2337.08
Michigan Tech.	226.36	27.68	8.62	5.72	11.36	14.76	1.00	295.50
Northern Mich.	278.70	——	17.23	13.01	33.92	——	2.00	344.86
Oakland	83.00	98.30	47.60	8.20	21.30	10.00	5.50	273.90
Saginaw Valley	28.10	26.90	11.60	1.20	3.90	4.40	——	76.10
Univ. of Mich.								
Ann Arbor	1354.64	283.21	395.58	89.03	175.09	——	186.40	2483.95 (2224.72)*
Dearborn	34.57	6.88	10.37	2.43	6.99	——	7.14	68.38 (67.90)*
Flint	51.51	6.79	12.94	3.41	6.65	——	10.66	91.96 (90.75)*
Wayne State	501.18	526.00	175.46	40.39	162.53	59.18	48.32	1513.06
Western Mich.		756.03	110.56	50.66	36.31	7.60	——	1014.30
TOTALS	6098.66	1744.35	1175.63	286.28	794.70	171.33	325.70	10596.65**
	7843.01							
PERCENT	57.55	16.46	11.09	2.70	7.50	1.62	3.07	99.99
	74.01							

*"All Funds" accounting for FTE academic staff indicated. General Fund FTE count shown in ( ).

**Total includes "All Funds" accounting as submitted by the The University of Michigan.

Figure 5: Distribution of FTE Academic Staff by Function, State of Michigan: Public Baccalaureate Institutions



A/C No. 21185
Faculty Member: Snapout, Sam R.   SSN: 157-18-4177 Rank: Assist. Prof.

TEACHING EQUIVALENTS

DIRECT INSTRUCTION ------------------------ T.E. = 11.0

Dept.	Crse. No.	Sec. No.	Cr. Hr.	Cont. Hrs.	No. Stud.	Stud. Cr. Hr.
Psyc.	1102	001	3.0	2	385	1155.0
Psyc.	2302	004	4.0	3	23	92.0
Psyc.	2302	004	0.0	3	23	0.0
Psyc.	3201	001	4.0	5	29	116.0
Psyc.			11.0	13	460	1363.0

CONTINUING EDUCATION ------------------------ T.E. = 0.0

SUP. OF STUDENT THESES ------------------------ T.E. = 2.0

	No. Stud.		
Doctoral Dissertation			
Major Professor			
Advis/Committee	3	Total	3
Major Theses			
Major Professor	1		
Advis/committee	4	Total	5
Prob/Independent Study			
Major Professor	12		
Advis/Committee		Total	12
Total Students Supervised =			20

COUNSELING AND ADVISING ------------------------ T.E. = 0.0

Graduate Students		
Upper Division		
Lower Division	Total	0

INSTRUCTIONAL DEVELOPMENT ------------------------ T.E. = 1.0

RESEARCH ACTIVITY ------------------------ T.E. = 1.0

PUBLIC SERVICE ------------------------ T.E. = 0.0

ADMINISTRATION ------------------------ T.E. = 0.0

SCHOLARLY ACTIVITY ------------------------ T.E. = 0.0

TOTAL TEACHING EQUIVALENCE FOR SNAPOUT, SAM R. IS 15.0

Figure 6. Faculty-Activity Report (Individualized), Memphis State University

Staff Utilization

Output profiles such as that shown in Figure 7 (taken from a study of faculty activity in Wisconsin)[9] are useful for examining staff utilization. For example, one vice president for academic affairs found that in one of his five colleges, faculty reported an average of 20% to 25% of their time in instructional development activity, compared to a university average of about 5%. Now it is hazardous business to look at data this primitive so closely, but it is sometimes instructive. If we were inclined to a positive posture, such an effort distribution might suggest that a host of instructional improvements and innovations might emerge in this college in the near future. A more suspicious position is that this program

Activity	Professor		Associate Professor		Assistant Professor		Instructor/ Lecturer		Teaching Assistant		Other		Total	
	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%	Hrs.	%
TEACHING DUTIES	34	61.8	37	64.9	39	72.2	43	86.0	43	93.4	17	36.1	37	74.0
Group Instruction, Preparation and Associated Activities, and Student Conferences and Advising	24	43.6	28	49.1	81	57.4	39	78.0	37	80.4	7	14.9	30	60.0
Individual Instruction	6	10.9	5	8.8	3	5.5	--	--	--	--	1	2.1	2	4.0
Other Inst. Activities	4	7.3	4	7.0	5	9.3	4	8.0	6	13.0	9	19.1	5	10.0
ADMINISTRATIVE DUTIES (Departmental, School, College, and Institutional)	8	14.6	6	10.5	4	7.4	2	4.0	--	--	13	27.7	4	8.0
RESEARCH DUTIES	9	16.4	9	15.8	8	14.8	3	6.0	2	4.4	7	14.9	6	12.0
Departmental	4	7.3	4	7.0	4	7.4	2	4.0	1	2.2	4	8.5	3	6.0
Budgeted (Funded)	5	9.1	5	8.8	4	7.4	1	2.0	1	2.2	3	6.4	3	6.0
PUBLIC SERVICE DUTIES	2	3.6	2	3.5	1	1.9	1	2.0	--	00	3	6.4	1	2.0
OTHER DUTIES	2	3.6	3	5.3	2	3.7	1	2.0	1	2.2	7	14.9	2	4.0
TOTAL ALL DUTIES	55	100.0	57	100.0	54	100.0	50	100.0	46	100.0	47	100.0	50	100.0
Number of Cases	860		490		713		601		1462		485		4611	

Figure 7: Teaching Staff Time Utilization (Hours/Week) by Rank, University of Wisconsin — All Four-Year Campuses

activity category had become a convenient hiding place for faculty whose teaching loads were not exactly demanding.

Staff Allocation

By means of an output profile similar to that shown in Figure 8 (taken from faculty activity and staff planning records at Memphis State University[10]), one college dean found data to confirm one of his chairman's complaints that his faculty were severly overloaded – at least in comparison to departments similar in program level and role. From instructor to full professor, his faculty were averaging about 24 contact hours per week in instructional activity, compared to a contact hour average of about 15 to 16 in similar departments. This finding played an important role in staffing and budgeting discussions.

These illustrations were meant to give concrete emphasis to the decision applications of faculty activity data; but they were not meant to stress the use of activity data to the exclusion of other information inputs equally important and essential. Lest I be accused of administrative parochialism in these illustrations, let me move to the conclusion of the paper with a brief caveat emphasizing the need for a balanced and sensitive perspective in obtaining and applying faculty activity data.

A PHILOSOPHICAL AND MANAGERIAL CAVEAT

A few years ago, Robert Presthus published a paper in *The New Republic* entitled "University Bosses: The Executive Conquest of Academe."[11] There are numerous points in that paper which made me uncomfortable; but in my opinion, Presthus did academic administration a great service by exposing our proclivity for emphasizing managerial mechanics – housekeeping if you will – while neglecting the major purposes of our institutions.

We can produce on demand profiles of average class size, average salary by rank and college, number of FTE's devoted to instruction, and unit cost by discipline and instructional level; but we really don't know yet what all this means when it comes to quality of program output. The analogy has limitations, but a recent report from the NCHEMS program compares our position to that of the appliance salesman who can tell the customer exactly how much a washing machine costs and can describe in detail how the cost was derived, but cannot tell the customer with any assurance whether the machine will get clothes clean!

I. CURRENT STAFF PATTERNS

	Professor	Associate	Assistant	Instructor	FTE PT/Adjunct	FTE Grad. Asst.	Total Current FTE
Current Positions	6	6	12	–	0	(33) 8.0	32
Unfilled Positions	–	–	–	–	–	–	
Average Salary	18,733	16,283	12,760	–	–	–	
Average Raise (71)(%)	4.1	4.4	4.0	–	–	–	
Average Contact Hours	11.3	17.0	14.9	–	13.2		
Average Credit Hours	8.3	11.2	10.0	–	1.1		

TEACHING LOAD EQUIVALENTS	Dir. Instr.	Cont. Educ.	Thesis Superv.	Coun. Advi.	Insti. Devel.	Resch.	Publ. Serv.	Admin.	Schol. Actvy.	Total
	53.5	.5	8.9	2.6	1.0	10.5	6.6	5.5	10.9	100.0

II. POSSIBLE STAFF ACTIONS

1. Consider joint appointment for Director of Community Mental Health Clinic – our cost $5,000.
2. Reduce position 007 to three quarters appointment. Use money there to pay fees of graduate assistants funded on external funds.
3. Place position 009 on fiscal appointment to insure year-round operation of clinic.

III. PROJECTED STAFF PATTERNS

Based on Credit Hour Productions	38
Based on Unit Cost Allocation	26
Based on Number of Preparations	21
Based on FTE Student/FTE Faculty	44
AVERAGE	32 (0)

Figure 8: Faculty Planning Profile, Memphis State University

Thus, in our role as missionary to the academic savage, we tend to worship the means and forget the ends, ignoring the fact that many attempts to produce efficiency in organizations have a bad habit of producing exactly the opposite effect. This is not to suggest that academic administrators should be bashful in the application of any and all management tools available to us. But in both attitude and action, we should reveal that critical allocation/evaluation decisions will involve more than number crunching and computer printouts, that we will be sensitive to the important subjective information elements as well as objective data.

I'm reminded here of the report submitted by an expert in PPBS and other management techniques following his attendance at the symphony. He reported as follows:

> For considerable periods the four oboe players had nothing to do. The number should be reduced and the work spread more evenly over the whole of the concert thus eliminating peaks of activity.

All the twelve violins were playing identical notes; this seems unnecessary duplication. The staff of this section should be drastically cut. If a larger volume of sound is required, it could be obtained by electronic apparatus.

Much effort was absorbed in the playing of demi-semi-quavers; this seems to be an unnecessary refinement. It is recommended that all notes should be rounded up to the nearest semi-quaver. If this were done, it would be possible to use trainees and lower-grade operatives more extensively. Further, there seems to be too much repetition of some musical passages. Scores should be drastically pruned. No useful purpose is served by repeating on the woodwinds a passage which has already been well handled by the strings. It is estimated that if all redundant passages were eliminated, the whole concert-time of two hours and twenty-three minutes could be reduced to twenty-two minutes, and then there would be no need for an intermission.[12]

This illustration serves to remind us that not all human activity should be approached with computer and accounting ledger in hand.

It may be helpful for us to know trends in policy and practice from other institutions, but it is certainly as important for us to know how programs of faculty activity analysis impact upon our faculty. As we return to seek this intelligence, let us remember, therefore, that universities do not exist to be managed; but they cannot exist without some management, hopefully management that is both flexible and balanced. There is a time for consensus and a time for conflict, a time for independence and a time for control, a time for deliberation and a time for action, a time for participation and a time for authority, a time for fact and a time for feeling. A new season in the application of management tools such as faculty activity analysis will find us reflecting an artistic concern for person and place – revealing as much devotion to the goals of our institution as to the vehicles for achieving these goals.

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1. Quotation extracted from response to an open-ended question in the survey.
2. John E. Stecklin, *How to Measure Faculty Work Load* (Washington, D.C.: American Council on Education, 1961).
3. R. J. Henle, coordinator, *Systems for Measuring and Reporting the Resources and Activities of Colleges and Universities*, National Science Foundation, NSF 67-15, 1965.
4. Leonard C. Romney, *Faculty Activity Analysis: Overview and Major Issues*, Technological Report No. 24, National Center for Higher Education Management Systems at Western Interstate Commission for Higher Education, Boulder, Colorado, December, 1971.
5. *Ibid.*
6. "A Summary of Full-Time Faculty Activities," Report from the Bureau of Institutional Research, University of Minnesota, Fall Quarter, 1969.
7. "Academic Staff Survey – Fall, 1970: Public Institutions of Higher Education in Michigan," Department of Education, State of Michigan, Lansing, December, 1971.
8. "Faculty-Activity Report (Individualized)," Office of the Vice President for Administration and Planning, Memphis State University, February 1, 1972, p. 501.
9. "Characteristics and Utilization of Time of Teaching Faculty," University of Wisconsin and State University Systems, First Semester, 1970-71.
10. "Faculty Planning Profile," Office of Vice President for Academic Affairs, College/Department of Human Resources, Memphis State University.
11. Robert Presthus, "University Bosses: The Executive Conquest of Academe," *The New Republic*, February 20, 1965, pp. 20-24.
12. Quotation extracted from response to an open-ended question in the survey.

FACULTY RESOURCE ALLOCATION/EVALUATION MODELS: THE FACULTY PRODUCTIVITY & DIFFERENTIAL TEACHING LOAD INDEXES

T. Wayne Keene
University of South Florida

The equitable allocation of faculty positions – higher education's most expensive single resource – to the various colleges or departments of institutions of higher learning has been a growing problem in recent years. The tradition of assigning faculty positions to the president, dean, or department chairman who has the loudest voice or who delivers his pleas with the right blend of pathos and passion is doomed. The demise is being hastened by strained treasuries, skeptical legislators and governing boards, and the current emphasis on accountability and systems in the decision-making process.

The heart of the problem is the determination of a method of allocation which can achieve true equity in the resulting faculty workload. Various criteria have been used, such as number of working hours per week, class contact hours, course credit hours, number of class sections, student-faculty ratios, and the like. But seldom, if ever, have such criteria formally recognized the differences between the various academic disciplines with regard to true workload requirements. That is, there are discipline differentials which are not accommodated by simply assigning a certain number of class contact hours per week, or a certain number of credit hours, or a certain number of students, to all faculty. In addition, when workload formulas have been imposed, they rarely were based on meaningful evaluation of existing workload in terms of the formula factors.

Presented here are two models for allocation of faculty positions in colleges and universities. A reasonable degree of simplicity is characteristic of both. The first, the Faculty Productivity Index, is the more complex. The other, the Differential Teaching Load Index, is fairly simple but is nevertheless powerful, particularly if suitable assumptions are made about class enrollments.

The objective of both models is to achieve as equitable distribution as possible of the faculty positions made available to the institution by legislative or governing board authorizations. A parallel objective is to evaluate teaching loads among the various colleges or disciplines.

THE FACULTY PRODUCTIVITY INDEX

The Faculty Productivity Index is based on three factors assumed to be significant in measuring the instructional loads. The three factors are: (a) student credit hours; (b) faculty class contact hours; and (c) student contact hours. The factor, student credit hours, is defined as the average number of student credit hours produced per full-time-equivalent (FTE) faculty member. For example, an instructor whose full time assignment is teaching a course giving three hours of credit and enrolling 100 students would produce at the rate of 3(100) = 300 student credit hours per FTE faculty.

Faculty class contact hours is defined as the average number of hours per week per FTE faculty spent in conducting class sessions. Student contact hours is defined as the average number of hours per week spent by each FTE student in attendance at scheduled class activities.

Once the average faculty workload or productivity requirements for the institution as a whole are determined, based on budgetary or other considerations, the corresponding workload requirements in the various colleges or disciplines are established by use of ratios to the overall figures. Since the number of positions requested usually exceeds the number permitted by appropriations, the application of a ratio system can help insure that each of the academic areas will receive an equitable share of faculty position resources made available to the institution.

The rational for development of the system of ratios was based on a study of faculty workload at the University of South Florida. The academic units used in the study, and for which differential productivity factors were developed, were the general academic areas of business administration, education, engineering, fine arts, language and literature, natural sciences, and social sciences. Student credit hours were calculated by three levels: Lower (freshman and sophomore courses), upper (junior and senior courses), and graduate (post baccalaureate courses).

Total student class contact hours per week were determined for each of the academic units by analyzing registrar data. This figure was then divided by the FTE student count for the same academic unit. The result was the factor, student contact hours. These calculations were made for all courses conducted by the several academic units.

The student credit hour figures by level mentioned earlier were weighted, since in the budget faculty positions were generated using reduced productivity requirements as the levels increased. The reduction was based on the assumption that workload per student enrolled increases at the higher levels. In order to be consistent with budget requirements, these levels were used in deriving the weights. The productivity required for each budgeted FTE teaching position at the lower level was 400 student credit hours. For upper level positions the figure was 270, and for graduate level, 125.

The weighting factors were derived by using lower level as the base; i.e., lower level was unweighted, or 400/400 = 1.000. Upper level was weighted by the ratio of lower to upper level, or 400/270 = 1.481. Graduate level was similarly derived: 400/125 = 3.200. These weights were applied to student credit hours by level in the various academic areas. This procedure permits the simplicity of working with a single student credit hour productivity figure while recognizing the variable teaching loads built into the budget authorizations for the three levels of instruction. For example, if an instructor were teaching 100 student credit hours at the lower level, 50 hours at the upper level, and 30 hours at the graduate level, his total weighted productivity would be: 1.000(100) + 1.481 (50) + 3.200(30) = 270.05 weighted student credit hours.

The following averages were derived for each of the academic areas: (a) weighted student credit hours per FTE faculty (student credit hours); (b) teaching contact hours per week per FTE faculty (faculty class contact hours); and (c) class contact hours per week per FTE student (student contact hours). Overall averages were computed for all areas combined, resulting in a "university" average for each of the three factors. The overall average for each factor was established as a reference point and assigned a value of 1.00. Then each academic area average for each of the factors was computed as a ratio to this overall value. For example, if the student credit hours per FTE faculty in college A was 300, and the overall or university average for that factor was 350, then the student credit hour ratio for college A would be 300/350, or 0.86.

Once the ratios were calculated for each of the three factors, certain assumptions were made about the manner of their use in deriving the summary workload factor, or Productivity Index. The first assumption was that the student credit hours figure per FTE faculty revealed by the study was reasonable. That is, judgments would not be made as to whether a particular figure was "too high" or "too low." It follows that the student credit hour ratio was used in its direct form.

The second assumption was that a load-equalization principle applied to faculty contact hours. That is, if teaching contact hours per week per FTE faculty in a particular college departed from the university average for that factor, then the amount of adjustment needed to bring the college average to the university average would be included in the computation of the productivity ratio. For example, if teaching contact hours per week per FTE faculty in a particular college was 72 percent above the university average, resulting in a ratio of 1.72, then 1/1.72, or 0.58, was used as the faculty contact hour factor. Therefore the reciprocal of the faculty contact hour ratio was used in deriving the mean of the three factors.

The third assumption was that the load-equalization principle likewise applied to student contact hours. For example, if the number of hours per week spent in scheduled class activities per FTE student in a particular college was less than the university average, resulting in a ratio say, of 0.83, then 1/0.83, or 1.20, was used as the student contact hour factor. Similarly, if the original ratio was 1.27, then the factor ratio would be 1/1.27, or 0.79. In other words, it was assumed that the fewer the class contact hours per FTE student, the smaller the faculty workload, and the greater the class contact hours, the greater the workload. It follows that in order to make the necessary workload equalization adjustment, the reciprocal of the student contact hour ratio was used in deriving the mean of the three workload factors.

The summary workload factor – the Productivity Index – was derived by computing the arithmetic mean of the following factors: (a) the student credit hour ratio; (b) the reciprocal of the faculty class contact hour ratio; and (c) the reciprocal of the student contact hour ratio. Let P = Productivity Index, S = student credit hour ratio, F = faculty class contact hour ratio, and C = student contact hour ratio. Then

$$P = \frac{S + 1/F + 1/C}{3} . \qquad [1]$$

The Productivity Index for each college is multiplied by the average weighted student credit hours per FTE faculty position required by the institution budget. That product is then divided into the weighted student credit hour load projected for that college. The resulting figure is the number of FTE faculty positions required by the college to conduct its instructional program for the year in question.

As an example of application, suppose that for college A, S = 1.35, F = 0.83, C = 0.92. Then the Productivity Index

$$P = \frac{1.35 + 1/0.83 + 1/0.92}{3} = 1.21 .$$

Suppose further that the average weighted student credit hours per FTE faculty position required by the institution budget, M, equals 300 and that the projected enrollment for college A results in 50,000 weighted student credit hours, H. Then the total number of FTE teaching faculty positions, T, generated for college A can be determined from the following general formula:

$$T = \frac{H}{P\ M} . \qquad [2]$$

Specifically, $T = \frac{50,000}{(1.21)(300)} = 137.7$. If the number of current positions in college A is 125.5, then 137.7 - 125.5 = 12.2 is the number of new positions to be allocated to college A. It can be seen from formula [2] that the grand total teaching faculty positions in the institution, K, can be expressed in general terms by

$$K = \sum_{i=1}^{n} \frac{H_i}{P_i M} . \qquad [3]$$

The Productivity Index permits flexibility in that its value can be changed if administrative judgment so determines. If for example the original Productivity Indexes for colleges A and B are 1.15 and 0.90, and it is decided as a matter of policy that their workload should be equal, then the Indexes can be adjusted to whatever value is desired. The colleges in turn could accommodate the adjustment by modifying any or all of the three factors covered by the Index.

We next consider an allocation model which is based on the relationship between credit hours of teaching load and the resulting weekly clock hours required for direct supportive tasks. It is considerably simpler, though perhaps less accurate, than the one just discussed.

THE DIFFERENTIAL TEACHING LOAD INDEX

The traditional method of assigning faculty workload and projecting faculty position requirements usually has been based, in some manner or another, on the course credit hour. That is, a certain number of credit hours is assumed to be equivalent to a full time teaching load. Many far-reaching decisions in higher education, from department distribution of class section teaching assignments, to allocation of positions to schools or colleges, have in some way been related to the familiar credit hour teaching load criterion. Even those faculty involved in such "non-teaching" duties as administration, advising, research, and public service have frequently worked in terms of released time from an assumed full-time credit hour teaching load.

Such credit hour load criteria have usually ignored the differing true workloads imposed by teaching in the various disciplines. For example, the "standard" full time teaching load might be specified as 12 hours, or 15 hours, etc., for an entire institution. It is rather well known among faculty that credit hours alone is not a very accurate measure of the actual workload involved in teaching various disciplines. In other words, a 12 hour teaching assignment in English might be quite different from a 12 hour assignment in history.

Still the credit hour load criterion is so imbedded in practice and is so commonly understood that it would seem advantageous to design a faculty position allocation and evaluation model based on the course credit hours. Such a model can be developed based on the relationship between the course credit hour teaching load and the amount of faculty effort required to sustain that load. The model takes into account the differences among academic disciplines or discipline clusters and formalizes such differences in a uniform procedure. The model also accommodates differences due to level of instruction (e.g., lower, upper, graduate).

It can be meaningful to assess faculty teaching load in terms of course credit hours if the additional factor of weekly clock hours of work in support of such credit hours is considered. A recent study by this investigator, for example, provided the relationships between credit hour teaching load and academic area shown in Table 1.

TABLE 1

Sample Academic Areas	Weekly Clock Hours of Work Per Credit Hour of Teaching Load, By Level			
	Lower	Upper	Graduate	Combined
Business Administration	2.8	2.0	3.1	2.0
Engineering	3.5	3.8	3.1	3.6

Let us assume, for example, that 40 clock hours is the total time required of one FTE teaching faculty per week. Then the total credit hour teaching load for business administration lower level courses equivalent to one FTE position would be 40/2.8 = 14, or 40/3.0 = 13 for all levels combined. The corresponding load for engineering, all levels combined, would be 40/3.6 = 11. That is, a 13 credit hour full-time teaching load in business is equivalent to an 11 credit hour load in engineering. We will call these load ratios "teaching load factors."

Projecting the total course credit hours of classes required to accommodate anticipated enrollment, then dividing by the FTE teaching load factor, will produce the number of FTE positions needed for instruction. A general formula for generating teaching faculty positions would take the form,

$$T = \sum_{i=1}^{n} t_i, \qquad [4]$$

where T = teaching positions for all disciplines combined, t_i = teaching positions for the "i"th discipline, and n = number of disciplines or academic units. Now

$$t_i = \frac{C_l}{F_l} + \frac{C_u}{F_u} + \frac{C_g}{F_g}, \qquad [5]$$

where C_l, C_u, and C_g equal credit hours of classes required at the lower, upper and graduate levels respectively; F_l, F_u, and F_g equal the teaching load factor at the lower, upper, and graduate levels respectively.

As an example, suppose that for department A, $C_l = 18$, $C_u = 12$, $C_g = 6$, $F_l = 14.3$, $F_u = 13.3$, $F_g = 12.9$. Then

$$t_i = \frac{18}{14.3} + \frac{12}{13.3} + \frac{6}{12.9} = 2.63$$

That is, department A requires 2.63 FTE faculty positions allocated to conduct its classes. The number of courses required, and hence the credit hours of classes offered, would be determined by policy on such matters as breadth of offerings and average class size. Aggregation of positions for all disciplines or academic units in accordance with formula [4] would provide the total number of FTE teaching positions needed.

The Differential Teaching Load allocation model is flexible in that the factor, class contact hour, can be substituted for credit hour. This is an important point to those institutions which are now having to account for faculty teaching load in terms of the contact hour rather than the credit hour.

SOME CLOSING REMARKS

It should be noted that the allocation models discussed here generate faculty positions for instruction only. Positions for other responsibilities, such as administration, advising, research, and public service, can be generated by less complex procedures. However, such positions cannot be ignored. Some program budgeting systems require that they be separately programmed. For convenience these latter types could be included in the formulas by simply making a few assumptions and changing the factors. There is little evidence to suggest a direct relationship between these types of activities and class enrollment or discipline differentials. For example, number of administrative positions depends upon institutional organizational policy, advising relates to number of majors by discipline, research depends upon projects approved, and so on.

The sum of these latter types of positions and the teaching positions generated earlier would constitute the total faculty position resource to be allocated to support the institutional program. Once faculty positions are derived, funding requirements can be calculated by assuming average salaries and faculty unit costs for support staff, supplies, and equipment, followed by costs for support programs such as general administration, libraries, plant operation and maintenance, and activities related to instruction.

Resource allocation models should be re-examined from time to time to assess responsiveness to institutional goal changes, non-traditional programs such as independent study and external degrees, and enrollment trends. Such evaluations require accurate management information systems, particularly in the areas of faculty workload, enrollment and finance.

A desirable objective in allocation models is to maintain a proper balance between detail refinement on the one hand and operational simplicity on the other. The former might be of value to impress scholars, but the latter is essential in today's complex higher education dynamic.

RESOURCES IN THE COMMUNITY COLLEGE: CONSTRAINTS AND OPPORTUNITIES

David W. Leslie
University of Virginia

I am reluctant to begin with a statement about another crisis facing American higher education. This is because it is not altogether clear that the community colleges face an imminent crisis, but it does seem clear that they are faced with a predicament which, left untended, could turn into a crisis for them. The central problem is one of productivity, and it is born of a special tension which exists as a result of the current weakness in the financing of all higher education. It is my contention that one possible route of attack lies in a reformation in the way in which we view our resources.

CONDITIONS UNDERLYING THE DILEMMA

Just as the rhetoric of the America dream of equal justice under law has led, in the past decade or two, to an accounting for the legitimacy of our practices in education, so has the resultant expansion and extension of opportunity led to a very stark accounting for the cost of higher education. This accounting can only lead to a new and intense concern for productivity in our colleges and universities.

Although history shows that it is not unusual for American colleges to be in financial trouble[1], our present situation seems unprecedented because of a number of unique factors coming into play simultaneously. First, the reigning public ideology declares that higher education is a public right. If it is a right, the general reasoning goes, financial barriers in the form of tuition charges cannot be allowed to bar access to those who most need to take advantage of their rights. Medsker and Tillery have shown that implementing this ideal – to the extent that it has occurred – results in a continuing decrease in the share of the cost of his education contributed by each student in the community college. Public investment or subsidy is commonly seen as the primary source to fill this widening gap between the actual costs of a student's education and the individual's contribution.[2] Whatever the solution proposed, it remains a political reality that public colleges and universities cannot ignore their mandate to educate ever larger portions of the population at an increasing cost per student without transferring those costs directly to the "consumer." The community college, of course, bears the heaviest responsibility for providing low-cost open access to higher education.

A second factor which is having (or is about to have) a strong impact on the community college is also implied by the ideology of open access. It is reasoned[3] that equal educational opportunity demands accountability on the part of the institution rather than on the part of the student for student learning.

The first factor, pressure for low-cost education, forces a preoccupation with the efficiency of institutional operations. The second factor taken alone forces a preoccupation with the effectiveness of institutional operations. By "efficiency," I mean a concern for minimizing the cost of each unit of output. By "effectiveness," I mean a concern for maximizing the value of each unit of output. Intuitively, the two can be perceived as mutually exclusive; a preoccupation with efficiency is thought to ignore the quality of output, while a preoccupation with effectiveness is thought to ignore the question of cost. Shoddy goods can be made efficiently; cost overruns seem to accompany an insistence on effectiveness. This illustration, of course, overstates the case for the sake of argument. At some points in the past, colleges have had the luxury of responding to pressures for more efficiency or for more effectiveness at different times, but it is doubtful that these pressures have ever been felt to operate so strongly in concert as they do at this moment. The public is demanding as never before that higher education produce, and as never before they are offering direct challenges to traditional academic isolation, privilege, and non-accountability.

The call for effectiveness hits the open-door institutions with particular force. Community colleges are being asked in effect to guarantee optimal learning experiences for their increasingly heterogeneous student bodies. It is not enough, we are beginning to admit, to provide low-cost access to the kinds of opportunities urged by the Carnegie Commission, but the institutions must assume responsibility for seeing that access bears fruit for the clientele. The alternative is a little like having free access to a supermarket only to find empty shelves or shelves stocked with food priced out of reach. The peril in educational institutions is, as we all know, that the open door will become a "revolving door." Revolving doors in too many cases have bred and nurtured public cynicism (particularly among minority groups) toward education at all levels. Edmund Gleazer[4] reflected the public impatience with selective but ineffective programs in higher education when he demanded that community colleges ask not whether their students were college material, but whether the colleges were student material.

It seems adequate to point out that, unless put in a new light by badly needed research, current attrition rates in community colleges of between 50% and 67% are indications of institutional ineffectiveness.[5] To borrow from industry for the sake of an analogy, there is a lot of wasted raw material being generated in our production processes. Our "raw material," however, has a right to be processed to completion. The option of being wasteful with surplus raw material does not exist for the community college. The laws of supply and demand are short-circuited by human rights in the educational sphere.

The recent Carnegie Commission (1970) report, *The Open-Door Colleges: Policies for the Community Colleges,*[6] provides a good synopsis of the elements required for effective education in the two-year institution. These include a legal mandate for open admission, a statewide administrative mandate for provision of comprehensive educational programs at each community college (including transfer, general education, remedial, occupational, continuing education, and cultural enrichment programs), provision for effective counseling and guidance of students, and – the real kicker – low tuition or no tuition at all in public two-year institutions. Increasing public and professional pressures will demand not only that these comprehensive recommendations be implemented at each institution, but that they be effectively implemented.

The second problem involved in the productivity dilemma arises out of the fact that, regardless of how effectively we perform our mandated functions, it keeps costing more for each student who comes to us. Inflation is not totally responsible for this rise in costs.[7] A large portion of the "cost push" can be attributed directly to increases in faculty salaries, to increasing standards of quality for facilities and equipment, to development of new and costly programs, and the like.[8] All of this occurs in a time of generally rising costs and a rather marked retrenchment in the public sector. Theodore Schultz has described the squeeze which faces educational institutions in a time of rising costs:

> There are few or no gains in the measured productivity of labor entering into higher education. It follows that if the price of labor rises and if its productivity remains constant (other things unchanged), the price of the services it renders must rise; that is, the cost of higher education per student must rise.[9]

ALTERNATIVE SOLUTIONS

It seems to me that there are three possible alternatives for an institution seeking a way out of this blind alley. They are: (a) to subsidize increasingly expensive programs by increasing funding from present sources; (b) to subsidize increasingly expensive programs by tapping new sources; and (c) to seek – in Virginia Smith's words – new ways of producing "more for less."[10] It is this latter strategy which attacks the problems of effectiveness and efficiency, the elements of the productivity dilemma, head-on.

It is acknowledged that perhaps the second alternative has not been fully explored, but long-range prospects for new funding sources are murky at best; I am not prepared to suggest where one might turn.

With regard to the first alternative, it should be evident by now that we are on the verge of exhausting existent sources or funds if we have not already done so. The community college mission is partly bound up with the assumption that financial barriers cannot be permitted to prevent attendance. Student fees cannot be increased, and laying at the feet of government the burden of rescuing colleges and universities from financial collapse simply doesn't take account of the extreme financial problems facing most governmental units in the United States. Community colleges which rely on local property taxes face taxpayer revolts and a declaration by state courts in California and New Jersey (and federal courts in Texas and Minnesota) to the effect that this means of financing public education is unconstitutional. The federal government will not soon be a major source of substantial help. Regardless of the form federal support takes, the real issue at the federal level lies in appropriations. Representative George Mahon, Chairman of the House Appropriations Committee, was quoted in January of this year on the prospects for funding support of higher education:

> Think of us talking about the financial distress of the colleges when this nation and this federal government are in an even more critical state of financial distress. Yet we seem to be debating this bill as though we had the money in hand or in sight to finance the programs about which we are talking . . . . But do we have the money? Of course not. Are we inspired to go out and raise the revenues to get the money? Of course not.[11]

Faced with this sort of appraisal for more federal money, one cannot be terribly optimistic. The states, which will clearly become the focus for financing all public education in this decade, do not now seem in general to be a great deal more solvent than other governmental entities, but there is some variability among states on this score.

My general recommendation is that the community colleges turn to the third alternative – more for less – for several reasons. The first reason is that the "less" will be forced on us anyway by essentially static funding of higher education. The second reason is that the spirit of "more" is essential to the mission of the community college; it is by nature a service organization and its mandate is to provide. The third reason is that institutionalized education has never been more in need of innovation and change than it is now.

But by what magic can one extract "more" from "less" in the real world? Basically, it can only be brought off by altering the processes by which input is converted to output; that is the main focus of any effort to increase productivity.

AVAILABLE RESOURCES AND THEIR RECONCEPTUALIZATION.

Perhaps the best way to proceed is to explore the relationships inherent in the cost simulation model described by Hopkins.[12] The planner looks for opportunities and constraints in making his projections, and so the terms of the cost simulation model need to be identified for their constraining or providential characteristics. When one term is identified as a constraint, the search for opportunities has to be directed elsewhere.

The cost simulation model is " . . . a large-scale, deterministic, computer model for making detailed predictions of future resource requirements."[13] It uses the basic linear equation, $y = a + bx$, as a tool to specify the cost of specified institutional activities. In actual use, the terms of the equation are stated in matrix language. For illustrative purposes only, the fact will be ignored here. One reason for using matrix algebra is that cost and activity figures can be specified for the smallest possible units within the institution and there can be considerable gains in the efficiency of arithmetic operations when dealing with matrices by means of a computer. The cost figure for a given program is represented by "y." Fixed requirements inherent in operating an institution are represented by "a." Unit cost figures for a given activity are represented by "b." What Hopkins refers to as "system activity" – roughly speaking, the number of units to be processed – is represented by "x."

The typical *modus operandi* of planning operations envisions y program costs as a dependent variable. The other side of the equation has been treated as a summation of independent variables. In a more or less rational fashion, a, b, and x have been manipulated to produce an estimate of required levels of support for given programs. The assumptions we have made about the community college and the decision to pursue the "more for less" option impose a very different set of rules upon the manipulation of these variables.

Most importantly, y suddenly becomes a constraining variable. It cannot be increased at will to meet the projections of the other figures. Likewise, the properties of x are dictated by provisions for open access; students seeking entry and who cannot be denied become units of system activity. The planner no longer has the luxury of being able to determine the number of places available for the convenience of keeping his projections manageable. (All of these statements are relative and, of course, apply in a general sense rather than to any given institution.)

Given these assumptions – that increases in y (budgetary resources) are unavailable and that x (system activity) is a somewhat uncontrollable but presumably increasing factor – it becomes obvious that the planner is left with a (fixed costs) and b (unit costs) as his only opportunities. These are the things he can manipulate in the real world in order to balance the books.

Any of these assumptions and conclusions are, of course, subject to contradiction or qualification in the real world. The projected slowdown in population growth, a sudden economic boom, a realteration of the tax structure and/or national priorities, and a change in political factors could immediately affect any truth in what I am saying.

But what I have said, in effect, is not really startling; a and b represent cost factors and new ways to be found of holding them down in such a way that overall effectiveness does not decrease. In the ideal situation, increased effectiveness needs to be associated with decreasing unit costs. I can agree, somewhat reluctantly, that the real world is not likely to permit realization of such a utopian prescription. But the mathematics of the situation leads me to that prescription if my assumptions about finance and the community college's mission are correct.

Resources we know can be seen as either opportunities or as constraints. Resources which are seen as fixed normally function in planning projections as constraints, while resources which are seen as changeable at will normally provide the planner with his opportunities. Institutional researchers have had the luxury of defining reasonably predictable increases in capital and operating budgets as opportunities. Typically, also, ways of structuring the educational process itself have been defined as constraints, as system parameters. This situation will have to change if our assumptions are correct. The roles of different variables will have to be reversed. If budgets have become constraints, then ways of structuring the educational process will have to be treated as our available opportunities. Both Smith[14] and Schultz[15] have suggested this reasoning in explicit terms.

Accordingly, the most realistic proposal for dealing with the dilemma posed is to identify soft resources as opportunities. If hard resources like money and facilities are constraints, then soft resources, the concept of which needs to be developed more concretely, of necessity become the available opportunities.

Essentially, the notion of soft resources is uncomplicated. Those elements of the planning equation which have always operated as constraints must now be treated as variable at will, as opportunities, as resources to be tapped to the advantage of the institution and its clientele. Traditional constants like faculty and student workload definitions, traditional class schedules, methods of evaluating and certifying student performance, time sequences, the physical arrangements of instructional activities, modes of transmitting information, and institutional goals have long been treated as fixed. At best they have been allowed to vary in degree or quantity. Classrooms are added, student-faculty ratios are adjusted, faculty workload is adjusted, evening classes are scheduled, and so on. Budgetary resources have normally been converted to more of the same things.

My argument is that the basic planning model, which normally conceives of hard resources (budgets and plans) as opportunities that are convertible into more of the same programs and activities, must undergo a fundamental reorientation. In the absence of an opportunity to increase hard resources, the other opportunities available lie with a reformation and restructuring of the elements of the educational process. We need to find ways in which soft resources can be treated as opportunities to enhance both the effectiveness and the efficiency of community college programs. Presumably, once again assuming the truth of my assumptions, this is the primary way in which we can hope to meet the standard of increasing effectiveness while decreasing – at least in relative terms – the cost of education.

In short, providing more for less will require that the planner build into his models of the future, altered conceptions of the ways in which education might take place. He must conceive alternative modes of education and the organization of his institution as resources which can provide him with opportunities for increasing productivity.

The Newman Report,[15] the Carnegie Commission report entitled *Less Time, More Options,*[17] Ivan Illich's *Deschooling Society*[18] and Arthur M. Cohen's *Dateline '79: Heretical Concepts for the Community College*[19] all at least implicitly urge the reconceptualization of "soft" resources as opportunities in the search for more effective means of educating. Smith[20] has suggested that we may need to turn to this approach as we search for economies in the face of declining financial support. Clearly, research is needed to help us find the ways in which exploitation of soft resources can simultaneously satisfy the community colleges' needs for more efficiency without any loss of effectiveness.

CONCLUSION

It is clear that in the coming decade the community colleges will be at the center of significant educational reform. The reforms will not be entirely voluntary; they will likely be forced by the squeeze between public demands for low-cost universal higher education and the inability of the public purse to sustain present methods as the way in which to meet that demand. The implications for planners are profound. The matter of their analysis will become less and less financial and material and more and more concerned with the human processes involved in the organization and conduct of education. They will need to become sophisticated in the nature of these processes and will, as never before, be called upon to evaluate those processes.

Our goals are two: 1) to find new ways of making community colleges more effective institutions; and 2) to do this without recourse to increasing hard resources. If we succeed, education will likely take place in ways that bear little resemblance to our current practices.

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PARTICIPATIVE GOAL-SETTING IN THE COMMUNITY COLLEGE: A SYNTHESIS OF INDIVIDUAL AND INSTITUTIONAL PURPOSE

George A. Baker and Richard L. Brownell
National Laboratory for Higher Education

INTRODUCTION

Revolutionary change seems to be the hallmark of the seventies. Many authors have commented upon the nature of our turbulent times. Alvin Toffler's best seller *Future Shock* described "the dizzying disorientation brought on by the premature arrival of the future."[1] Although Toffler saw education changing rapidly, he viewed much of that change as "no more than an attempt to refine the existent machinery, making it more efficient in the pursuit of obsolete goals."[2]

Bennis, in his book *The Temporary Society*, expressed the opinion that we too often strive for efficiency and effectiveness within a narrowly defined range of familiar acts. He noted that "the martinet general whose beautifully disciplined fighting machine is wiped out by guerrillas will probably still lay claim to efficiency, but we need not agree with his assumption that efficiency consists of doing an irrelevant thing well."[3] It could be added that an educational structure might effectively achieve its internal goals but still be considered inefficient in terms of meeting the educational needs of society.

If education is ever to reform in a time of chronic and bewildering change, it must begin to view the task of defining relevant goals and achieving a consensus of goal priorities as a primary function of educational leadership. Goal-setting, operationalized through participation, can become a primary means for "transforming human purpose into communicable forms for the direction of organizations."[4]

New organizational patterns emerging in a growing body of literature emphasize the need to equate power equalization and individual growth along with task performance. Bennis views participative institutional forms not as vague ideals, but as functional necessities in a society where creative enterprise must be nourished to insure survival.[5] Today's administrative structure must be appropriate for a world where complex organizations require expertise in many fields, thus making bureaucratic administrative control from the top ineffective. It must meet today's growing demand for creative, self-directed, educational professionals who are capable of solving problems in a bewildering climate of change, rather than simply conforming to yesterday's routine status quo.

A 1971 blue ribbon panel in its *First Report of the Assembly on University Goals and Governance* stressed the theme that educational reform could be stimulated through "governance by delegation and accountability."[6] The rapidly expanding costs and complexity of education in a time of challenging social needs have led to increasing demands for accountability. The premise that those who operate public educational institutions have an obligation to account for educational results would probably not be seriously challenged by many people. Disagreement is more likely to be rooted in the issue of putting accountability into practice. Who is to be accountable, for what and to whom, and under what conditions?

Accountability is intimately related to organizational purpose because it aims squarely at results. Since purpose can only be achieved through the people in an organization, accountability cannot really be divorced from leadership. We believe that accountability for the community college should be viewed in terms of achieving learning that meets the needs of both students and society. Individual colleges can begin the process of putting the philosophy of accountability into practice by allowing concerned individuals to participate in setting goals tailored to meet the unique needs of the students and the community in light of the resources available. That participative goal-setting process can enable a board of trustees to adopt goals for which participants have indicated a willingness to be held accountable.

The focus for change at a community college is vested with the president. Accountability should begin with him. As educational leader, he is held accountable for overall institutional purpose by his board of trustees. The president can point his institution in the direction of student learning, but human motivation must be harnessed to move it forward. This can be done through participative planning within a team-oriented climate of leadership that allows all members to see themselves as accountable and united by their individual contributions to the common goals of the college. We believe the primary function of educational leadership to be that of providing direction. We view educational leadership in terms of an organizational climate that involves people in defining and achieving organizational purpose. It is, after all, people who enable a community college to become accountable.

Today, we want to tell you about a National Laboratory for Higher Education product that can help translate the philosophy of accountability into practice. It is called *Goal-Setting for Organizational Accountability: A Leadership Strategy* (GOALS). It provides a realistic, field tested strategy for integrating the people and the purpose of community colleges.

The development of the GOALS product was accomplished in two steps. First came the process of classifying appropriate goal statements. Then a strategy was devised to achieve goal consensus and set goal priorities.

CLASSIFYING GOALS

An analysis of the community college environment allows us to classify three kinds of goals:

a. Overall purpose or program goals;
b. Instructional ends goals;
c. Management support goals.

The overall purpose goals link the outputs of the college to the state systems. The instructional ends goals define the desired outputs of the college. The management support goals provide the support necessary to achieve instructional goals.

Overall Purpose Goals

The nature of the community college mission as it varies from state to state, dictates the development of overall goal statements that meet the needs of various state systems. The following North Carolina State programs for community colleges are typical overall purpose goals:

a. Operating a college transfer program;
b. Operating two-year degree technical programs;
c. Operating one- or two-year vocational programs;
d. Operating an adult education program;
e. Operating a community services program;
f. Operating a continuing education program.

Instructional Ends Goals

The two-year college is primarily a teaching institution. Therefore, instructional ends are the desired outputs of the community college. The following statements are typical instructional ends goals:

a. Increasing basic skills;
b. Raising the level of vocational achievement;
c. Raising the level of educational achievement;
d. Increasing problem solving ability;
e. Improving critical thinking ability;
f. Improving self concept.

Management Support Goals

Management support goals are statements of desired administrative ends that meet the challenges of the academic and social environments. These challenges must also be quantified in terms of desired results. Academic, social, and administrative goals such as those listed below were developed to show the need for increasing the quality and quantity of student learning.

Academic Goals:

a. Reducing student attrition;
b. Eliminating failing grades;
c. Providing individualized courses.

Social Goals:

a. Actively recruiting the poor and disadvantaged;
b. Insuring that lack of personal financial resources do not provide a barrier to qualified students;
c. Increasing faculty and student involvement in the community.

Administrative Goals:

a. Hiring personnel dedicated to student learning;
b. Planning for long-range development;
c. Allocating funds in accordance with priorities to meet established goals;
d. Evaluating the progress of the college toward stated goals.

Management support goals include statements of desired academic ends, social ends, and the administrative ends necessary to achieve them. Together they provide the focus and support necessary to achieve instructional ends and thus accomplish the overall purposes and mission of the college.

A STRATEGY FOR ACHIEVING CONSENSUS

Classifications of goal statements, such as those we have discussed, are not difficult to develop. The real problem is devising a strategy for achieving consensus on goal statements and priorities.

The strategy used in the NLHE GOALS product involves the participation of a representative sampling of the entire college community. Ideally, the board of trustees, the faculty members and administrators, as well as stratified random samplings of the student body and the citizens of the community should participate. The participative goal-setting process takes place in a workshop setting and lasts about five hours.

Participants rank-order goals in three stages. The first Individual Sort represents initial individual judgements of goal priorities. This is followed by a Group Sort in which heterogeneous teams of four members each (student, teacher, administrator, citizen) reach group consensus in rank-ordering goals. The negotiations necessary to achieve consensus require open communication between persons with differing orientations about the purposes of the college. Finally, participants rank-order goals for the last time in the Second Individual Sort.

First Individual Sort

The GOALS Display Board is divided into three areas. The white area at the top is for Overall Purpose or Program Goals. The blue area is for Instructional Ends Goals and the red area is for Management Support Goals.

First, the individual is allowed to determine the relative priority of programs assigned by the state. He is asked to rank-order statements of overall purpose from most important to least important. This may be the participant's first exposure to participative goal-setting.

Next, he is allowed to assign priorities to Instructional Ends Goals. He is told that the blue area of the board represents the resources available for instructional ends. He is asked to focus on the instructional outcomes desired in relative order of importance. He cannot exceed the parameters on the board. The area available for placing the 20 goal statements as well as the importance of the goals themselves force the participant to make difficult choices.

Finally, the participant is allowed to determine the priority of Management Support Goals within the limits of the board. He then notes the results of his first individual sort on a data sheet provided.

Group Sort

In the second round, participants are grouped heterogeneously in teams of four (student, faculty member, administrator, citizen) to represent the various orientations of people within the college community. The team, through open discussion, negotiation, and compromise develops a team solution to the problem of rank-ordering all of the goal statements. Consensus tables show the members when there is sufficient agreement to accept a statement without discussion. Since the team members are dealing with the actual proposed goals of the college, they are expected to express and support their views forthrightly. The resulting open, frank, and candid interchange of viewpoints is an essential step in promoting consensus.

Second Individual Sort

After participating in the team solution, each person finally rank-orders the goals again in the Second Individual Sort and notes results on the data sheet. This can be considered a posttest. When compared to the First Individual Sort (pretest) the changes that resulted from communication during the team session can be identified.

REPORT

After the workshop is completed the individual data sheets are returned to NLHE for analysis. Pretest and posttest data are coded on computer punch cards. The overall consensus of all participants as well as the concensus of each group (students, faculty, administrators, citizens) is determined from the computer printout. The following management information is included in the report:

1. The ranking of each goal statement;
2. The degree of consensus achieved for each goal statement;
3. The range of opinion for each goal statement;
4. The attitude of participants toward the participative goal-setting process.

SUMMARY

Today, we have presented a realistic and validated strategy for integrating the purpose and people of a two-year college. The strategy is more than theoretical because it has been tested in actual community college environments in North Carolina, Texas, Virginia and Florida.

Dr. Max King, President of Brevard Community College at Cocoa, Florida, summarized our thoughts about this product when he said: "We have had seminars on goals before, but they always seemed to end with the frustrating feeling of being open-ended. This GOALS product allows the participation of concerned people while still managing to 'close the loop' and achieve consensus on goal statements and priorities."

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1. Alvin Toffler, *Future Shock* (New York: Bantam Books, 1970), p. 13.
2. *Ibid.*, p. 39.
3. W.G. Bennis and P.E. Slater, *The Temporary Society* (New York: Harper and Row, 1969), p.10.
4. W.G. Hack, C. Briner, S.J. Knezevich, R.C. Lonsdale, R.E. Ohm and G.E. Srouse, *Educational Futurism 1985* (Berkeley: McCutchan Publishing Corp., 1971), pp. 99-100.
5. Bennis, *op. cit.* pp. 2-17.
6. Hack *et al.*, *op. cit.*, p. 190.

CURRICULUM REFORM AND RESOURCE USE IN THE COMMUNITY COLLEGE

Samuel E. Kellams
University of Virginia

By the ground rules of this seminar we must find ways of making community colleges more effective institutions without increasing costs. This paper seeks to explore the use of resources – both "hard" and "soft" – in promoting an efficient and effective institution. We shall conclude that curriculum reform, to be defined in terms of the manipulation of soft resources, holds considerable promise for achieving our aim. "Hard" resources are here used to mean money, facilities, and ordinary academic manpower. "Soft" resources include at least the following: (a) the definition and redefinition of goals and objectives; (b) the use of time; (c) the use of space, especially nonacademic space; (d) student competencies and motivations; (e) program and instructional options; and (f) nonacademic manpower.

It seems clear that there is no way of knowing whether a community college is more effective or more efficient without agreement on goals at any given institution. Simply lowering the cost per student does not increase efficiency unless it can be shown that there is no corresponding reduction of the quality of the educational output. Thus, in order to provide criteria of effectiveness we need to specify goals and objectives through program levels and ultimately at instructional levels.

While there is no intention here to define the criteria of effectiveness in any specific way, the basic mission of the community college can reasonably be set forth as follows: to provide relevant post-high-school learning opportunities to as many persons as possible within a geographical region and to ensure a high-quality learning output for each of these people. To implement this mission the following three policies must be in operation. (a) The community college will operate according to the *egalitarian* policy of access – the "open-door" policy. Educational arrangements are to encourage students to enter and to be motivated to continue once they do enter.[1] (b) The community college seeks to provide a diverse set of programs for the diverse clientele it serves, i.e., it seeks to be *comprehensive*. (c) It seeks to be a *community* college rather than merely a college located in the community. The traditional town-gown barriers cannot remain if the college is to engage the surrounding community in the ways well described by Harlacher.[2]

HARD RESOURCES

With this general criterion of effectiveness in mind, let us examine some of the "hard" resource solutions to the twin problems of efficiency and effectiveness.

The Management Division of the Academy for Educational Development has published a pamphlet entitled *319 Ways Colleges and Universities are Meeting the Financial Pinch.*[3] This document is divided into two sections: "Increasing Income" and "Decreasing Expenditures." What is remarkable is that nearly all of the items assume a hard resource model, i.e., that education will continue to be conducted as it has before. Another remarkable thing is that the great bulk of the items, if implemented in a community college, appear likely to reduce the effectiveness of that institution.

A crude content analysis of the 319 items was undertaken with the following question in mind: Would the item, if implemented in a community college, while cutting costs or increasing income, be likely to reduce the effectiveness or leave the effectiveness unchanged?

Of the 69 items suggested to raise money, most would severely jeopardize the community college's mission. Here are some examples:

- (a) Making nonrefundable all advanced deposits from admitted students;
- (b) Increasing fees for reading and speech clinics;
- (c) Charging full cost of overhead for all special projects on campus;
- (d) Increasing the number of concession businesses on campus and charging them more.

Some 250 items relate to cutting costs within the institution. Most of these costs were cut by reducing available hard resources (money, manpower, facilities and equipment) or replacing human resources by equipment resources. An analysis of the potential effectiveness of each item shows that:

- – 31 items have potential for raising effectiveness;
- – 79 items would probably not change the effectiveness;
- – 140 items would likely lower the effectiveness of the community college.

Here are some examples of cost-cutting items likely to increase effectiveness:

- (a) Making greater use of adjunct faculty;
- (b) Simplifying admission procedures, registration, record keeping, i.e., reducing the number of forms and documents required;
- (c) Constructing classrooms of various sizes in order to reduce vacant seats in occupied classrooms.

Those likely to leave effectiveness unchanged:

- (a) Investigating pool or consortium approaches to saving on insurance costs;
- (b) Automating routine tasks wherever possible.

Those likely to reduce effectiveness:

- (a) Recruiting students from affluent areas to reduce the number of scholarship applicants;
- (b) Phasing out the Dean of Continuing Education;
- (c) Eliminating technical services to private industry unless fully self-supporting;
- (d) Building a core program which all first-year students must take;
- (e) Cutting down the number of subscriptions to periodicals and newspapers.

While it takes little imagination to see that these latter forms of belt-tightening are probably not acceptable for the community colleges, it remains an empirical question as to the specific impact of an efficiency measure upon the effectiveness of the institution. At the very least, questions like these should be raised. What are the potential monetary savings? What are the potential costs? What will be the impact of the change upon the mission of the institution? Upon the effectiveness of the several programs of the institution? Are there alternative ways of gaining efficiency without reducing effectiveness? Surely these are questions which institutional researchers can be involved in raising and in helping to answer.

There are other ways, beyond fund raising and belt-tightening, to meet the financial problems of community colleges. These include increasing enrollment to achieve economies of scale. Data from the Carnegie Commission on Higher Education[4] suggest that some economies of scale can be achieved for public two-year colleges up to about 2,000 FTE enrollment. For private two-year colleges, most of which have very low enrollments, considerable economies could be gained by increasing enrollment. However, as Virginia B. Smith[5] points out, small private two-year colleges are unlikely to use this method of gaining economies because of their position in a competitive student market and the link between their size and the particular institutional style and educational thrust which they embody.

For a comprehensive community college there is a minimum size below which it ceases to be comprehensive. However, at such a size it may still be an inefficient institution and a financial loser. In practice, state systems of community colleges can afford some smaller institutions if they can gain economies of scale in more populous areas. Again, we must point out that discussions of size and efficiency or effectiveness usually assume a traditional model of education. Under different educational arrangements very small enrollments and very large enrollments might prove both efficient and effective.

There is yet another general solution to the financial bind which is more in evidence today: various cooperative arrangements among colleges, such as mergers and consortia. This is another way of gaining economies of scale, this time by pooling resources rather than increasing enrollment. The advantages of these arrangements to cost cutting and better use of hard resources are well known. Specialization of equipment and manpower is facilitated. Full use of facilities is promoted, etc. Again, however, the model is academic and traditional. And again there are questions of effectiveness to be raised. How much loss of autonomy (and therefore sensitivity to local needs) does an institution suffer? In a sense, highly centralized state systems of community colleges can be considered as "cooperative arrangements." The effectiveness over the long run of the individual institutions in such systems should, however, be closely examined.

All of the aforementioned ways of cutting costs – and there are still others of similar ilk – share something in common. They call for the manipulation of hard resources – money, academic manpower, facilities, and equipment. Most are trying to promote efficiency. The thrust of what I have said is that we need also to ask about the effectiveness of the particular scheme for community colleges, and ultimately for each community college. I have implied that the manipulation of hard resources only, while keeping the structure of the educational enterprise intact, will probably limit the achievement of both efficiency and effectiveness of the community college.

SOFT RESOURCES

Let us now take one or two categories of soft resources and explore the possibilities for making the community college more effective and more efficient. Once considered as fixed patterns which serve as constraints in the hard resource model, these soft resources can now be seen as changeable and therefore as opportunities. As a group these resources are the stuff of curriculum reform.

Take first the use of nonacademic space. We have been accustomed to creating learning environments on campuses and usually within classrooms – these are academic spaces. Yet, there are other places (spaces) where learning might effectively occur at a reasonable price: for example, within other community agencies such as manufacturing plants, government agencies, banks, hospitals, police departments; in homes; in decentralized learning centers or skills centers located in abandoned buildings; even in subways; in the use of field experiences of all kinds.

The plan of work-study or cooperative education is a good example. Only about 200 colleges and universities now have cooperative programs, but the advantages have been recorded in a number of places.[6] Most recently, Morton Rauh has presented a model of the financial operation of a hypothetical work-study scheme. He has shown how student enrollment might double from 1000 students to 2000 students if a work-study model is used. His figures show only a 33% increase in total operating costs for a one-year period. The efficiency comes, of course, by having one-half of the students off the campus at any given time in productive jobs, during which it is assumed that significant learning takes place. Learning, in other words, takes place in less costly settings than the classroom or the laboratory – less costly because nonacademic space also serves other purposes. Capital expenditures may be less as well. Costly, specialized equipment is used rather than purchased and maintained. Because co-op students earn salaries, their costs of education are less and financial aid resources may be freed for use with other students.

How effective is this particular use of nonacademic space? The advantages reported seem to be especially cogent for the community college. Students have the opportunity to apply classroom learning to practical job situations. Considering the nonacademic orientation of many community college students,[7] this is no small gain. Students have a chance to test their vocational interests in realistic settings, thus facilitating career development, another much-heralded aim of the community college. Both faculty members and employers learn from cooperative arrangements. The student becomes a kind of mutual feedback mechanism from college to community, a "retraining agent" as it were. Employers are stimulated by new ideas and fresh theoretical perspectives, while instructors have their academic pronouncements modulated by the panoply of constraints which ordinarily obtain in the "real world." In this sense the student himself becomes a soft resource for total community education, a mandate toward which community colleges often lay claim.

Perhaps the greatest potential effectiveness of the use of nonacademic space, of which cooperative education is but one example, is that it strengthens the community dimension of the community college. The essence of this dimension is the mutual relationship in which the wider community uses the resources of the community college and the community college uses the resources of the wider community. Indeed, some argue that schools and colleges should become coordinators, designers, and engineers of nonacademic, soft resources – community resources.[8] Such an arrangement is seen as an opportunity to return education back to the community, to promote communication between students and adults and between the social classes, to prevent age-grading, and to reduce the moratorium period on adulthood before young people can become productive members of society.[9]

Actually, cooperative education is just a special case of the now-fashionable "college without walls," "open university," and the "external degree." All of these approaches involve the use of nonacademic spaces as learning environments. Some, like the Open University of Great Britain, have been shown to be both efficient and effective.[10] The Open University is a baccalaureate degree level program using TV, radio, programmed materials, and local study centers toward a general education. Operating costs the first year came to $632 per student, which compares favorably to approximately $1000 per student for public community colleges. Also, the costs to the student were considerably below costs at other British or American Colleges.

That the Southern Association of Colleges and Secondary Schools has now begun to evaluate nontraditional programs in new terms is an indication of the growing legitimacy and the changing educational structures which accompany the use of soft, instead of hard resources.[11]

In addition to the use of nonacademic space, the variable use of time is an important soft resource. Indeed, time is the pivotal variable in the "learning for mastery" system, espoused by Benjamin S. Bloom,[12] which underlies the movement toward individualized, systematic instruction. Both the point-in-time and the duration of time become exploitable as a soft resource. Learning can take place at any time in a person's life or career, at any time of day or night, and at any time other resources are available to the learner. Because the community college is committed to the education of everyone in the community who needs further learning, the duration of learning intervals must correspond with the motivation, ability, and other activities and interests of the learners. So we have "stopping out" instead of dropping out; we have cassette tapes and video tapes instead of Monday-Wednesday-Friday at nine; we have modular scheduling, evening classes, summer study, and interim terms; we have programmed self-study materials and a host of other attempts to eliminate time as a constraint in the educational life of persons.

Another major theme of curriculum reform is the broadening of options open to the student. Not just doing the same thing at a different time in a different place, but providing qualitatively different kinds of learning activities – both in substance and in style. Genuine options are ways of tapping another important category of soft resources: the motivation, competence, and interest of students. Considering the diverse student body to be served by the community college, individualizing instruction and curricular choice seem essential for effective education. Bowen and Douglass have shown how various innovative instructional options can be both efficient and effective in comparison with traditional instruction.[13]

It is especially incumbent upon community colleges to provide options which reach students with nonacademic motivations and abilities. This is true in order to provide localized, legitimate exploratory possibilities for persons not financially able nor motivated to relocate at special-purpose institutions, or at large colleges, before they gain a clear thrust to their careers. In other words, the community college must be as comprehensive as possible to be effective. The same is not true of other institutions where the purposes are more specialized, more academic, or more cosmopolitan.

CONCLUSION

It would take a much longer paper to explore fully the use of soft resources in restructuring educational opportunities. Let me conclude by emphasizing the following main points.

(a) Any consideration of economies to be gained by the use of hard or soft resources must consider also the effectiveness of each such use in terms of criteria which are in line with the mission of the community college.

(b) Most suggested economy moves deal only with the manipulation of hard resources – money, academic manpower, facilities, and equipment. This is true of belt-tightening measures, economies of scale, and various cooperative and consortium arrangements. Many of these measures engage only the ancillary or support programs rather than the central education enterprise. Thus, the potential for large economies or increased effectiveness is not great. Some of these economy moves are, in fact, likely to cause a decline in the effectiveness of the community college.

(c) There is evidence that the use of soft resources holds some promise for both more efficient and more effective operation. The use of time, nonacademic space, and student motivation and competencies as soft resource variables are salient features of the newer patterns of education. These soft resources must be viewed as changeable and manipulated to release the community college from constraints imposed by traditional patterns of hard resource use.

(d) While logic and the literature suggest the foregoing analysis, each institution must define the criteria of effectiveness in operational terms for itself. Questions of efficiency and effectiveness must be raised as soft resources are systematically employed to restructure the learning patterns. Empirical data are needed in each case on the costs and benefits of soft resource utilization. Institutional researchers should play an important role in this entire process. The hope is to build a base for decision making which is guided by an awareness of the unique mission of the community college and informed by analyses of the potential efficiency and effectiveness likely to obtain when various resources are put to use.

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RECONCEIVING AND REALLOCATING RESOURCES IN THE COMMUNITY COLLEGE: A RESEARCHER'S PERSPECTIVE

Fred A. Snyder
Virginia Department of Community Colleges

My colleagues – Leslie, Kellams, Baker and Brownell, – presented several notable ideas related to reconceiving resources at the community college. My comments will suggest that there are a number of other considerations which must be involved in such reconception. I will examine several conditions and needs extant at the community college, some concomitant problems, the solutions of which may be prerequisite to any reconception of resources, and several ideas for working through these toward a more viable community college system. I will not attempt to be comprehensive, fortunately for you who are tired of sitting, and more questions may be raised than answered.

Let me warn you in advance that while I do believe that reconceiving and reallocating resources is necessary, it is not the crux of our educational problem at this time. Our *basic* problem is to understand the scope of our mission, our institutional conditions, our clients, and what educational experiences are needed. Once we understand these, there is little doubt that significant restructuring and reconceiving of our resources *will* occur, and to the advantage of our educational objectives.

GIVEN CONDITIONS

While it is difficult to generalize about the community college across the country, it shares some conditions which bear on the panel topic, some of which were noted by earlier speakers. These include:

a. A shortage of traditional resources such as general and specialized physical facilities, land, parking, etc;
b. A faculty which was educated largely for roles at institutions other than the community college;
c. A general mission to "meet the educational needs" of the specific community in which it is located, rather than serving selected needs of a larger region;
d. Continually soaring enrollments;
e. A resistance to increased costs and expenditures.

The shortage of traditional resources needs no documentation. But the effects of faculty characteristics, while often discussed, are not as well known. There are great expectations for the community college to carry out an expanding comprehensive mission, supported in part by a stream of favorable publicity from national agencies, by growing educational needs in higher education, by a willingness of two-year colleges to accept a comprehensive mission, and by some demonstrated success by two-year colleges in fulfilling certain of the expectations thrust upon them.

Enrollments at community colleges grew tremendously during the 1960's and that trend is projected to continue. The USOE predicts an enrollment increase during the 1970's of between 80 and 90% in two-year colleges, about twice the rate of increase expected at four-year colleges.[1] Factors affecting enrollments at community colleges reflect not so much population growth, but an extensive and growing array of educational services such as continuing education, education for the disadvantaged, and programs in new career areas such as community and health services.

BASIC NEEDS

These conditions just noted are accompanied by concomitant needs for information and knowledge which must be met by community colleges to carry out their expanding mission. We must be fully cognizant of these needs as we reconsider availability and uses of resources. The comments of my colleagues lead me to mention several such needs which bear particularly on our topic.

It has become trite to state that the community college must identify more clearly its students so as to develop programs of relevance for them. But many colleges still have not determined fully who their students are. One reason is that many of the colleges are new. For example, a majority of the 23 community colleges in Virginia still have not completed their fourth year of operation, and their early efforts have gone toward assembling the usual resources of land, buildings, personnel, and dollars to meet the immediate demands for education which they found. These colleges only now are getting around to a systematic appraisal of who is to be served, including existing and potential students.

The concept of "relevant programs" is exceedingly difficult to operationalize at the community college, because of many interrelated variables: student groups, program areas, student goals, student motivational patterns, and political support. Let me illustrate. We have students of varying ages, readiness for learning, and socio-cultural-economic background; programs in foundations skills, occupational-technical, and transfer areas; student goals which range from casually general to intensely vocational and personal; motivational patterns and problems which we understand but little; and clearer political support for traditional programs than for newer programs. Of special interest are the latent or invisible student groups such as those who reside in urban ghettos and in isolated rural and mountainous areas. The task is to expand our horizons and relate operationally three elements: (a) human and social conditions, (b) existing and latent educational needs, and (c) configurations of resources which are optimally productive and efficient. The researcher and his academic colleagues must obtain and use information about students, operations, and outcomes, then design and implement systems models and programs, and obtain assessments of these structures and outcomes from them. We must not be confined to the classroom setting, but must creatively utilize any available resources. Arthur Cohen,[2] William Birenbaum, and others have pointed the way.

I noted earlier that not all community college staff are ideally prepared to work there. Educators such as Frances

Kelly, Florence Brawer, Art Cohen, and Lamar Johnson have documented the backgrounds of two-year college faculty and have offered some partial solutions for modifying their attitudes and capacities. In his setting, the researcher must help design and implement a strategy for identifying faculty characteristics and developing appropriate professional in-services experiences.

The college must also determine which students it is serving best and which it is serving less well or not at all. This question might relate to educational programs, social-economic-cultural student groups, or to the goals of students regardless of their educational programs and backgrounds. It is probably simpler to determine how well we are serving specific student groups than to determine why differential outcomes occur. But answers to quantitative questions about outcomes are necessary, and can open the way for further investigation of causation and development of new, more effective programs.

BASIC PROBLEMS

We encounter many basic problems when we confront unmet needs associated with community college education. One is the lack of suitable criteria and configurations of criteria with which to study either effectiveness (productivity) or efficiency. In the past, effectiveness or productivity has been associated with the number of degrees granted and the proportion of incoming students who have earned degrees. But with more heterogeneous student groups enrolling at the community college, and with the growing array of educational objectives for these students, it is no simple matter to evaluate success or failure. We lack a model for evaluating educational outcomes which is sufficiently broad in relation to student input and outcome expectations.

Just what does it mean that community colleges have dropout rates of 50 to 75% as Leslie noted? I ask that question with some frustration, because neither I nor, to my knowledge, my colleagues can answer categorically and accurately. I have studied former students at several community colleges, but I have never embraced the whole problem.[3] The problem is complex, and community college staff have been unable to allocate their time to such problems which do not have an immediate payoff. However, the need for developing an evaluation model clearly grows; accountability has descended upon us and cannot be put off. And we will respond to its press, either on the terms of non-educators such as legislative groups, or on our own terms which allow cognizance of the intracacies and subtleties involved – if we move fast enough. Fortunately, at the Virginia Community College System we may be moving toward developing conceptually and validating empirically a student-outcomes model that is appropriate for us in areas of occupational-technical education.

Without really solving the first problem, let me move to another – a problem of outmoded tradition. The early origin of the community college was shaped by a different mold from what now exists. Consistent with ideas by William Rainey Harper and Robert Hutchinson of the University of Chicago, the first junior college at Joliet, Illinois, began with an existing high school offering post-graduate studies in traditional collegiate work acceptable for transfer to existing colleges and universities. The *community* college idea developed later, following the notion that it orient itself to the great mass of people who would not be going to four-year colleges.[4] Certainly the occupational-technical student, the disadvantaged student, and the part-time student enrolled in either community services programs or credit programs demand objectives, practices, and environments quite different from those of the earlier junior college tradition. But this tradition presses against developing and accepting solutions to contemporary educational needs, and we must restrict its influence.

David Leslie noted the assumption that the community college is a more efficient mode of higher education. That is, students can get more educational accomplishment for less dollar investment. While that may indeed be true for the student with a baccalaureate objective, it is not necessarily a relevant assumption for others. For many students at the community college, it is their *only* access to higher education, regardless of effectiveness of efficiency.

Similarly, Leslie's concept that (a) total costs are fixed by public resistance, (b) enrollments are uncontrollable due to the open access concept, and (c) consequently, fixed and unit costs must be reduced, can be called into question, at least over the short period. The concept undoubtedly holds some truth, but the difficulties of developing "new ways of producing more for less" are apparent when we are dealing with non-traditional students and non-traditional programs. Our experiences tell us that early stages of developing and perfecting new ideas are usually associated with higher costs than usual, rather than lower. And that is just the dilemma the community college is caught in. How does one become innovative, effective, and efficient at the same time? Unfortunately, something has to give, and too often it has been innovation.

POSITIVE RESPONSES

We have heard Sam Kellams include as soft resources: time, cooperative learning experiences, continuing education for youth and older adults, and a variety of modes of learning activities. But we do not know the limits of their use and value, and it is going to take money to find out. Currently, federal funds are an important source of support for such experimental and developmental endeavor. At least where I work, such funds allow us opportunities beyond the regular operating budget to explore new learning arrangements.

Cooperative learning experiences are not new, as Kellams noted, having been used for some time by the University of Cincinnati, Drexel University, and a variety of other institutions of higher education which stress engineering and technology. Community colleges have been inexplicitly slow in adapting modes of cooperative education, and I see no reason for it other than the usual reluctance to change from traditional practices. For example, administrators and faculty would have to develop and maintain employer contacts as a partial alternative to generating classroom credits. For too long, we have associated education with completing academic credits, and although we agree it makes little sense, we continue to do so. It is not that cooperative work experiences have been tried at the community colleges and failed. At least, I know of no evidence that this has occurred. In one community college where cooperative work experiences are included in the curricula, graduates have shown a remarkable consensus that the co-op experience was most valuable.[5]

Kellams commented that continuing education through adult life seems to require little expense by the community college. Fortunately, evidence also exists that such educational experiences are rated very highly by older adults. Older adult students also tend to be more successful in their academic pursuits than students just out of high school.[6] In terms of the usual academic achievement or output measures, older adults tend to make the community college "look good."

Because of the many areas of needed research at the community college, including research with scarce or heretofore unused resources, I suggest the establishment of some structure to stimulate research and innovation on the part of staff members whose primary responsibilities are in teaching, counseling, or administrative activities. One idea for such a structure might be an experimental center. The experimental center might be as extensive as a multi-function building containing experimental facilities, or be no more than a budgetary line to support research and experimental innovative practices. At any rate, it would be an operating part of a college or college system.

Let me note several central elements of the experimental center concept:

a. It would serve to obtain and channel funds and other resources to support a series of R & D projects;
b. It would provide a broad context for selecting projects to be undertaken and for designing them to meet long-term needs and priorities of an emerging college;
c. It would provide certain administrative services for the innovator, such as assistance in developing proposals, development and administration of project budgets, access to specialized equipment and to supplies, and needed personnel services;
d. It would provide a shelter and budgetary support for existing staff members to plan and carry out their R & D work through released time or leaves of absence from their usual roles;
e. It would allow outside experts to be employed as *ad hoc* consultants or project leaders, and enhance the potential for innovation outcomes and staff development within the center.

Through the shelter provided by the center, new educational practices could be explored without the immediate need for demonstrating cost-benefit. Thus, to an extent we could remove the paradox of spending money for nonproductive outcomes in the face of declining fiscal support for higher education, providing we take a long-term view of the payoff from research and innovation. The center concept would not replace the work of researchers employed at specific colleges, but would add to their leverage through the several noted advantages. The commitment to the research center concept must be for a minimum of five years, as the payoff would accrue slowly.

Its chief value lies in the vast improvement over current occasional attempts at innovation at community colleges, most of which are piecemeal rather than strategic in scope. Current regional centers for educational development have pointed the way, for example, through the continued success realized in developing and implementing new instructional systems and new modes of focusing on educational goals, such as those George Baker and Richard Brownell have outlined.

A second idea which offers strong possibility for improved management of resources is an integrated information system – sometimes called a management information system or college information system. Such a system is technically and economically feasible, due to the relatively low cost of computer facilities which are also needed for routine college operations such as student registration and grade reports, and for instructional support to students in data processing and other program areas.

The integrated information system offers two specific advantages:

a. It allows the development of a broad data base about students, faculty, facilities, budgetary and fiscal operations, educational outcomes, and community characteristics;
b. It allows access to any segment of this data for purposes of summarizing, correlating, or converting to operational indexes, through the use of data processing modules and other devices.

The integrated information system provides fantastic possibilities for implementing an overall strategy for institutional assessment. Such efforts can include a broad variety of specialized management reports and evaluations of current conditions, operations, and outcomes.

One additional illustration of the non-traditional or "soft" resources to which both Kellams and Leslie refer to is this: buses are not new resources for our school systems, but their use at community colleges is rare. During recent years, one of our colleges in an isolated area of Southwest Virginia has purchased and used buses to transport students over mountainous roads to the college. A neighboring community college serving a similarly isolated and mountainous region, is about to receive a grant to provide buses equipped with classroom and laboratory facilities, not only to transport students to the college, but also to transport laboratories and classrooms to the communities. You may recognize this as a rural adaptation of the urban storefront college operation. Can you imagine the effects of human uplift which such an innovation might have in an area where social services rarely demonstrate a real concern for common folks out of the mainstream of our mobile society?

The idea has real possibilities which are possible to develop only through "seed" money not available in the regular operating budget. What is learned there may well result in modifications to our use and concept of fixed campus facilities. Let me say that we in Virginia aren't all against busing – regardless of what the news media tell you!

In summary, the researcher's role is crucial to understanding and implementing the mission of the community college. But it may not be manifested directly in the concerns of restructuring resources, rather, such restructuring will grow out of the prerequisite thinking and planning about our students and their unique educational needs, and the total human and resource milieu confronting the community college as a social institution.

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SHARING OF FACILITIES AMONG INSTITUTIONS

John T. Richardson
DePaul University, Chicago

INTRODUCTION: THE FACTS AND THE ISSUES

In institutions of higher education, shared facilities are now a fact of life. In recent years this sharing has increased appreciably and, in the foreseeable future, all indicators point to a continued increase in such sharing. Enrollment is growing faster than funds are increasing for expanded facilities. The cost of facilities for the ordinary support of educational programs, and especially highly technical facilities or equipment, is beyond the reach of many budgets. Sources of knowledge are growing exponentially and governing boards are enforcing economies in response to the demand for more accountability for the resources allocated to colleges and universities. The result of all this is that a healthy climate of cooperation among institutions is gradually replacing the spirit of rivalry.

A few examples of shared facilities might be cited as illustrative of what is happening over the country. The *Newsletter for Academic Consortia for Higher Education*, March, 1972, reported that there are now 125 library consortia which not only share library holdings, but cooperate in library procedures, funding, and staffing. A recently dedicated Tech Aqua Biological Station owned by the Tennessee Technological University has made available shared instruction and research in a facility used by eleven institutions in Tennessee and Western Kentucky. Two consortia in North Texas are now considering a merger that would consolidate equipment, staffs, and academic programs of 14 institutions to share microwave television transmission of courses among the campuses. In March, 1972, the Illinois Board of Higher Education received the findings and recommendations of a task force established to study the consolidation of computer resources in institutions throughout the State.

Although a relatively new phenomenon, at least in its present proportions, sharing of facilities has reached a point at which some hypotheses might be made about the present effectiveness of this sharing.

1. On-going academic programs can be improved in given circumstances by inter-institutional sharing of physical facilities. In some institutions, this sharing is only a part of a larger picture of cooperation in programs that involve personnel, various services, and common academic credit. Among other institutions, independent programs are offered but facilities are shared because, for one reason or another, it would not be feasible to duplicate these facilities. In either case otherwise unavailable resources may be added without a commensurate expenditure of funds in each institution. Additional cost is necessarily involved in all sharing, but all improvements come at a price.
2. Cost effectiveness can be realized through sharing facilities in support of programs or aspects of programs that would be offered. As an example, in Illinois public institutions, the computer costs increased at the rate of 24% per year between 1965 and 1972. By sharing computer facilities and services, the senior State institutions could have reduced an expected expenditure of $14.2 million in the current year by $3.5 million. The potential cost avoidance between 1972 and 1980 under the shared plan is in excess of $120 million with no reduction in level and type of service. This may be an extreme example, and it is well to bear in mind that there may be costs in sharing facilities that are not immediately evident, for example, the initial expenditure in the time and energy of administrators and faculties that might render some sharing financially unfeasible. In the total picture, however, there is little doubt that institutions can realize cost effectiveness and program improvement through shared facilities.
3. Private institutions stand to gain through sharing by reason of new attitudes, as well as academic and financial advantages. The latest edition of the *Consortium Directory* lists 66 cooperative arrangements classified as consortia, involving 662 institutions of higher education, an increase of 113% in the past five years. Private colleges and universities generally lead the way in such cooperative ventures, faced, as so many of them were, with the choice of reducing expenditures or closing. This financial adversity has had unforeseen blessings. An attitude of openness and cooperation with other institutions is displacing a previous exclusiveness. In the beginning, it seemed more congenial for private institutions to look to each other for assistance because of their common economic plight, but more recently cooperative plans are developing between private and public institutions, with the happy effect of creating a more harmonious atmosphere generally. Public policy is contributing positively to this through common requirements for reports to state and federal agencies that reveal needs and weaknesses that are similar in the two types of institutions. On the other hand, constitutional provisions have thrown cold water on private-public cooperation in some states. Nevertheless, it is safe to conclude that for the most part the private institutions have gained much through sharing facilities – in developing new attitudes, as well as improving programs and reducing costs.
4. Social forces are leading to more inter-institutional sharing of facilities among public colleges and universities. Conditions requiring this cooperation are not as serious as in private institutions, because inter-institutional planning of programs and financing is better than in private institutions. Many governing

boards or legislatures are either requiring a kind of inter-dependence through limitations on budgets or placing a financial premium on closer associations. This "mandatory" situation is less desirable in that it does not assure the conviction and genuine support of the institutions' administrations and faculties. Shared facilities would be a brighter prospect if the academic advantages were more evident to public institutions.

ISSUES STILL TO BE FACED

Even while we identify the advantages that have been realized through sharing physical facilities, we must keep an eye open to issues that could have considerable effect on institutions of higher education if this trend toward sharing continues to grow. Here are some of the more obvious issues.

1. What role is the faculty to play as sharing increases and interinstitutional associations grow stronger? Coordination leads to centralization and removal of more decisions from the very persons who are presumed to know more about the primary functions of a college or university, the faculty. Sharing emphasizes the social and economic aspects of education, while faculty have traditionally been more interested in their own discipline and preferred to educate the intellectually elite. Faculty are quite likely to point to the danger in shifting the priorities in higher education and evaluating its effectiveness apart from the distinctive goals that are less subject to quantitative measure but no less real, particularly to the faculty.
2. What new demands will be made on academic leadership in each institution as facilities and programs are shared? Higher education needs more, not less complexity of goals, degrees of difference, pluralism. The Carnegie Foundation warns that hierarchical models and systems among universities are moving steadily toward homogeneity rather than diversity, while the demand for diversity is growing because people and their needs are quite diverse. Even coordinated state plans for higher education recognize that state boards are bureaucratic agencies that must be counterbalanced by leaders in each institution who are sensitivie to distinctive goals and can apply all the resources to achieving these goals even if some of these resources are shared by other institutions with different goals.
3. Can the traditional concepts of institutional autonomy persist in the face of increased sharing of programs and facilities? There is no universally accepted definition or norm for institutional autonomy. Like academic freedom, it is broadly accepted as an absolutely essential ingredient if values and quality are to be maintained in universities. Social responsibilities place constraints on autonomy, and shared facilities are an outgrowth of this kind of responsibility. But the erosion of institutional autonomy can be minimized internally by the ability of the institution to pursue its own goals, and externally by the public acceptance of pluralism as a valuable asset that affects both public and private institutions.
4. As colleges and universities pool facilities and other resources to meet increased needs of students in traditional programs, there may be little concern and resources remaining for the non-traditional student and programs that are the object of the recent Carnegie Commission report, *Less Time, More Options: Education Beyond the High School.* There is a real danger that constant pressure for better utilization of facilities and similar economies could divert attention from many needs not currently being met. Interest and imagination are not enough; risk capital is also required, together with more respect for educational opportunities in non-academic institutions. It is perhaps unfortunate that at the precise time that institutions are called upon to render a full accounting of how they are using their resources for traditional functions, there is a cry to apply some of these resources in different directions.

In summary, the relatively short time experience with shared facilities has shown that academic programs can be improved, economies effected, and a healthy new attitude of openness created in both private and public institutions. It is not so certain that this continuing trend toward sharing facilities will not have adverse effects on the role of the faculty, leadership within the institutions, the autonomy of these institutions, and their ability to move ahead in meeting different needs.

REASSIGNMENT OF FACILITIES WITHIN AN INSTITUTION

William E. Stallman
University of Illinois at Urbana-Champaign

During the past decade or more, reassignment of physical facilities at most educational institutions has involved primarily reassigning space vacated by a unit which had received new facilities. This procedure is quite common for an institution in a positive growth pattern and until recently has been the case at the University of Illinois. In the future, however, anticipated enrollment trends as well as national and state economic limitations at Illinois indicate that large scale facility expansion has ended. All indications suggest this is a national trend. As a result, future reassignment of physical facilities will often involve solely an internal *exchange* of facilities between units rather than the past procedure of a net *addition* of facilities.

Implementation of such a plan of facility reassignment will not be an easy task. In order to do so, an institution needs to have data for answering the two following basic questions for each organizational unit involved:

1. What Facilities Do I Have?
2. What Facilities Do I Need?

The difference between these two sets of data will produce the desired net additional space need or excess for reassignment consideration. Although the above conclusion is not difficult to determine, it is somewhat difficult to establish procedures which will identify such space data in a meaningful way. Therefore, before discussing the topic of "Reassignment of Physical Facilities" I believe it's appropriate to spend a few minutes reviewing the principles and related mechanics often used in developing such base data.

DETERMINING WHAT FACILITIES I HAVE

A space inventory should supply the following information:

Where It Is:	Room Number and Building Name
How Much Is There:	Area in Net Assignable Square Feet
Who Has It:	Unit Assignment
What Is It:	Room Type
What Is It Used For:	Room Function

Such data is commonly cross-listed, for example, by building, department and room type. Through this cross-listing procedure, valuable comparisons and evaluations can be made quite easily.

DETERMINING WHAT FACILITIES I NEED

The procedures for determining "Need of Facilities" for institutions of higher education are much more complicated and, therefore, much less uniform than those of identifying existing facilities. For this reason, I shall limit my comments to those philosophies and procedures applied at the University of Illinois. These procedures were devised by H. D. Bareither, and are completely explained in his book entitled *University Space Planning.*

In establishing a procedure for generating space needs, the following criteria must be considered:

1. What types of space are required?
2. Will the procedure treat all units properly and permit comparison?
3. What factors will generate this need?

If the procedure is properly related to a sound inventory system, items 1 and 2 should take care of themselves. The factors which generate the need for space may be categorized as follows:

1. Student Enrollment by Level
2. Areas of Study Being Offered
3. Educational Policies of the Institution

Student enrollment is an obvious but important input factor. Such enrollments should be on an FTE basis by student level (Freshman-Sophomore, Junior-Senior, Beginning Graduate and Advanced Graduate). Since the areas of study involved also affect the space needs, enrollments should be distributed accordingly. The Social Sciences (English, History, etc.) are low space generators while the fields of Engineering, Agriculture, and Medicine are space hogs – comparatively speaking. Appropriate space factors for the involved areas of study must be determined. Finally, certain educational policies of the institution must be defined. Such factors as maximum class size, hours of instruction, room utilization, and student-staff ratios will have a direct effect upon space needs and must be incorporated into the system. *At this point,* I believe it is important to emphasize that space need calculations can be no more accurate than *the input data from which they are developed.* For example, if the student enrollments are inaccurate or poorly distributed as to level or field of study, corresponding inaccuracies will be incorporated in the calculated space needs. The same is true for weakly defined institutional policies or area of study space factors.

Without spending too much time on this subject of space generation procedures, let's look at a few simple examples to see how the above philosophies can be applied.

> Let us assume that institutional policy states that classrooms will be used 30 hours per week and receive at least 60% station utilization. The size of each classroom station (for all areas of study) is 15 net assignable square feet. Our generated space need calculation then is:
>
> $$\frac{\text{15 square feet/station}}{\text{30 hrs/wk x 60\% station utilization}}$$
>
> $$= \text{0.833 net assignable square feet/ weekly student hour}$$
>
> This factor, when multiplied by the total weekly student hour demand for classroom space, will produce the total net assignable square feet of space of classroom need.

Office space may be calculated in an even more straightforward manner. If institutional policy states that all faculty requiring office space shall generate a need of 135 net assignable square feet of office space, and assuming 100 FTE staff will require office space, the calculation becomes:

100 FTE x 135 sq. ft./FTE
= 13,500 net square feet office space

Similar procedures may be used to compute other types of space for the various organizational units. Calculation of research type space requires more detailed input data (level of student and type of faculty, etc.), but the resulting calculations are similar.

COMPARING SPACE AVAILABLE TO ANTICIPATED NEED

Upon completion of the above "Inventory" and "Need" determinations, an evaluation of the difference (space need or excess) can be made. Such evaluations should be made for a given future period. In other words, space reassignments should not be made to accommodate a past or current need – unless that need is to extend into the future. In addition to the amount of space, the quality of space, location of space, and possible appropriateness of space for other uses should be considered. These factors are ones of judgment and may temper the actual numerical calculations somewhat.

DISCUSSION OF REASSIGNMENT OF FACILITIES

Let's look at some of the details involved in planning facility reassignments. Take, as an example, University "1", where space calculations indicate the following *needs* for the fall of 1974:

1. Life Sciences . . .	30,000 net assignable square feet
2. Fine Arts	10,000 net assignable square feet
3. Architecture . . .	40,000 net assignable square feet
4. Administration . . .	5,000 net assignable square feet
5. Social Work . . .	10,000 net assignable square feet
Total Need	95,000 net assignable square feet

In addition, the space calculations indicate the following excesses for the fall of 1974:

1. Engineering . . .	80,000 net assignable square feet
2. Housing	140,000 net assignable square feet
3. Agriculture	20,000 net assignable square feet
Total Excess	240,000 net assignable square feet

Before any actual space exchanges can be considered, much additional homework must be done. Some of the factors that must be considered are:

1. *Permanency of Need or Excess.* Will the situation continue beyond 1974? One doesn't want to reverse space reassignments too quickly for both economic and psychological reasons.
2. *Condition and Location of Excess Space.* Is the space worth reassigning? How can it be released? Is remodeling for consolidation necessary? Would complete relocation of the unit be more feasible or more economical?
3. *Units to be Considered for Reassignment.* Should the units in need be considered for space in addition to the shortage indicated to compensate for inadequate existing facility assignments? Can the unit be physically split and still function adequately? Would properly designed new space be more beneficial?
4. *Timetable of a Reassignment Plan.* Must the remodeling be done in phases? How much space can be taken out of service for remodeling at one time? What is the amount of remodeling required? Will the funds be available when needed?

I think you see that determining the proper reassignment plan can become quite complex. The best solution can only be reached through trial and error planning and must be done by a professional unit which is capable of evaluating remodeling costs and is familiar with program needs, funding sources, and existing space quality.

To give you some idea of how the above factors might creep into the decision-making process, the general reassignment plan at University "1" could very likely develop as follows:

1. The Life Sciences need is really 50,000 net assignable square feet rather than 30,000 as initially indicated, since 20,000 net square feet of existing space is old, costly to maintain and should be razed. To meet this need, a new facility is the most practical approach since no available excess space is readily convertible to the wet laboratory type space required.
2. The indicated Engineering excess of 80,000 net assignable square feet will reduce to approximately 50,000 in 1976 and thereafter if Engineering enrollments recover as expected. Most or all of this amount could be released for reassignment if certain program consolidations are made and major remodeling applied to other space to be retained by the involved departments.
3. The Housing space can be converted to academic use with certain remodeling. Existing housing space is not air-conditioned, lighting is poor, laboratory plumbing is lacking, and elevators do not exist. The space could be converted most easily to office and dry laboratory space. Units such as Social Work, Administration, Architecture, and Fine Arts are all good candidates. Since the Housing space was originally funded through bonds, certain legal details must be worked out to insure the bonding collateral is not jeopardized. Remodeling costs of about $20 per square foot will be encountered, depending upon the specific work undertaken.
4. The Agriculture space excess will also diminish somewhat with time. The potential remaining excess would be difficult to consider for reassignment since it is created by overall poor utilization rather than any excess which could be isolated for reassignment consideration.
5. University "1" leases approximately 50,000 net assignable square feet of space from private enterprise through the acquisition of small leases over a period of time. These leases are to be relinquished

as they expire through planned conversion of excess space and related reassignments.

As mentioned previously, a reassignment program as suggested must be well thought out to create maximum usability of space in the most economical manner. It must also be well planned, however, to allow proper implementation timing. More than likely any large scale plan will involve several stages – perhaps extending over several years. The units to release space will usually have to do so through program consolidation. This will undoubtedly require certain facility remodeling to allow more multi-purpose use. Thus, the eventual space "loser" may be the first to gain improved space conditions. This could be a major incentive for appropriate cooperation. Under any conditions, the entire project timetable must be coordinated with availability of space and funds. Both can be difficult to predict and usually do not develop as originally envisioned.

Regardless of how sound and well planned any such program is, complete understanding and respect for the facility utilization program must exist within the institution. *This* means constant communication throughout its development and implementation. The inventory system must be understood and accepted by the involved units. To accomplish this, they must be involved in its development. Force the involved unit to provide you with base utilization information on a regular basis (annual or biennial). If this audit and communication link is "simplified" to merely correcting past information, accuracy, interest and understanding will diminish. This communication effort must also include the facility generation program. The involved units should know what input factors have been applied and have an opportunity to comment upon their determination. They should be educated as to the potential benefits as well as the consequences of such space calculations.

A final requirement for increasing proper communication and respect of the facility utilization program is for it to receive proper administrative recognition. Administrative decisions regarding space assignments should be based upon space utilization data. If the administration of the institution does not respect the facility utilization data, neither will the related academic and administrative units.

In conclusion, if the capital funding financial picture appears to be as bleak in your state as it does in the State of Illinois, serious consideration must be given to a well planned, soundly calculated, and properly administered facility reassignment program in order to cope with an overall stable enrollment with an ever-changing program need. In all honesty, we at the University of Illinois believe we have the basic ingredients for administering such a reassignment program but are just on the verge of having to implement it. How successful we will be, only time will tell.

INSTITUTIONAL RESEARCH IN THE NEW HIGHER EDUCATION ENVIRONMENT

Summary of Panel Discussion by Robert J. Parden, University of Santa Clara; Elwin F. Cammack, University of Wisconsin; John J. Coffelt, Youngstown State University.

The new period in higher education is described as continued growth through 1978, to be followed by declining enrollments; current financial support is anticipating the reduced needs after 1978. Historically, institutional research (IR) assumed a posture that was relatively detached from decision-making (and power), functionally independent of operating problems, and primarily focused on a rather narrow set of internal problems. Now the situation will cause institutional research to: (a) undertake studies in direct support of decision-makers; (b) move from an independent, contemplative research mode towards a current-operating-problem posture; (c) expand to include both internal and external problems for study; (d) undertake research to relate internal systems with state, regional, and national systems.

When institutional research focuses its efforts on existing internal programs and their evaluation, along with alternate programs and what they might provide (with consequences for reallocation), its reports will be studied by groups in conflict. IR will increasingly operate in a political environment. Critics will question the ability to do research in contrast to problem solving.

The "systems concept" describes the broader involvement perceived for institutional research. Each campus will be seen as being made up of interacting "little systems", i.e., academic departments, centers, institutes, service units, athletic squads, and other combinations of people, equipment, facilities, and activities. Then will follow aggregation of "little" systems into "larger" systems at the school, college, or university level, at the state system, regional, or national levels. The style of operation of institutional research will change. In particular, it will become more political as IR becomes aware of the dollar implications of research findings.

EIGHT YEARS OF PROGRAM BUDGETING AT THE OHIO STATE UNIVERSITY AND IN HIGHER EDUCATION IN OHIO

George W. Baughman
The Ohio State University

In 1968 I first reported to members of the Association of Institutional Research on the progress we had made at the Ohio State University after four years of work and two years of experience with university program budgeting. In 1970 I reported on "Program Budgeting in a Time of Crisis" *(in absentia* because the university was under siege). For this chapter of what appears to be a biennial report, I would like to briefly assess what has transpired in eight years of work toward university program budgeting at the Ohio State University and to compare it with what has happened with the Ohio Board of Regents statewide program budgeting system during this same period.

The most important question about any program budgeting system is "why?" Close on the heels of this question is "who?", and the answers to these questions will usually determine the "what" of a program budgeting system.

WHY PROGRAM BUDGETING?

In 1964 the Ohio State University was one of six state-assisted universities in Ohio and was experiencing tremendous growth. Roughly 50% of the public higher education enrollments and expenditures were accounted for by the university and, with an open enrollment policy and a predicted tidal wave of enrollments, there appeared to be no end in sight. Clearly there was a need to manage this growth. It was also perfectly evident that the relatively automatic incremental process that had served the planning budgeting process in the past was inadequate to the task of managing this growth for the following reasons.

1. Delegation of fiscal responsibility was not clearly established.
2. The process was disjunctive when an integrated approach was required – e.g., faculty and teaching assistant budgets were handled by academic affairs, equipment and operating budgets were handled by business and finance, sponsored programs were administered by an office of research.
3. Too little was known, even after the fact, about logical relationships between input and output, even with respect to instructional programs.
4. No standards or guidelines existed for even planning a major program thrust, let alone evaluating it.
5. No mechanism existed to put a sufficient number of "cards on the table" to enable an evaluation of the likely redundancy implicit in various requests.
6. The organizational structure lacked balance with respect to size of programs being undertaken and with respect to the managerial/administrative talent required to implement programs.

The Ohio Board of Regents, which had just been instituted in 1964, faced a similar kind of problem with respect to the management of growth of higher education. No master plan existed for higher education. The legislative budgeting mechanism for higher education was largely based on the individual institutional bargaining power, although an "Inter-University Council of Presidents" did cooperate in collecting data in a common format and, in part, in making a common plea. Furthermore there was a six-year history of dividing the resulting appropriation by the anticipated number of FTE students and expressing the subsidy in per-student terms. Support factors per student were, of course, different for each institution. This process was inadequate to the task of growth for the following reasons.

1. It was unlikely that growth could be accommodated by the existing institutions and equally unlikely that the six institutions would be the driving force behind starting major new universities.
2. There was historical data about institutions, but the enormous amount of analysis required to make their data useful to the budgeting process was beyond the capability of the State Department of Finance or Legislative Services Commission.
3. There was little rationale to the per-student differentials in subsidy, although by 1964 the formula did recognize graduate and professional enrollments differently than undergraduate.
4. The data that existed about institutions was fragmented and totally inadequate for even simple questions that required one to look at dollars budgeted, students taught, faculty and staff budgeted, and space assigned to a particular discipline.
5. Institutional reporting systems served internal management needs only (if they served any management needs at all) and were not susceptible to common formatting at anything other than a gross level.
6. The organization of higher education in Ohio lacked balance from both a standpoint of size of institution, nature of programs and, perhaps more importantly, geographical proximity. (Three major cities, Cleveland, Cincinnati and Dayton had no state-assisted universities within a 25-mile radius.)

WHO WAS INVOLVED WITH DEFINING AND IMPLEMENTING?

Knowing "why" a system is needed is important to understanding and evaluating end products of the system. Knowing "who" is involved is important to understanding and evaluating the way in which the end products evolve. The three C's of a budgeting system are credibility, continuity, and compliability and people are the most important ingredient in meeting these tests.

For example, unless the system represents the facts of resource allocation at a given level and is endorsed by the "resource allocators" in the system, it will fail for lack of credibility. Most colleges and universities depend heavily on continuity of effort (a degree commitment to a freshman will require four or more years to fulfill). If the budgeting system does not encompass this fact it will fail for lack of continuity. At the same time if the system is not responsive to what may be dramatic changes in resources, needs, and directions it will fail for lack of compliability. In all these cases the people who design and those who operate the system are the most important ingredient in keeping it viable.

WHAT HAS TRANSPIRED IN PROGRAM BUDGETING SYSTEMS?

Both the internal university and statewide program budgeting systems have grown, improved, and survived during eight rather turbulent years, which is some evidence of their compliability. In the case of the Regents' system the basic premise was that the establishment of a uniform information system driven by elemental inventory and activity reporting on students, faculty, other personnel, space, and financial data could yield a data base that would permit the common analysis of resource application in programs of instruction that in turn would permit the construction and validation of a programmatic model budget that could be applied on a statewide basis with very few exceptions.

The legislature has accepted common, aggregated, expenditure models for programs (course oriented) with from nine to ten different levels of instructional support (e.g., technical programs, general study programs, baccalaureate general, baccalaureate progressions, masters, doctoral, medical, graduate professional), with identical support factors for each program regardless of location, as a basis for appropriation during the last three biennial sessions. This is despite the fact that the political composition of the legislature changed and the temperament changed from one of modest to strong support (1967 and 1969) to one of modest to strong sentiments against support of universities in 1971. thus the continuity has been maintained.

Exceptions to the model program budgets have been very few and generally related to the start-up costs of an emerging institution. This is particularly important because the statewide system has added two brand new major city universities (Wright State in Dayton and Cleveland State in Cleveland), and incorporated or partially incorporated four existing private or municipal universities (Youngstown, Akron, Toledo, Cincinnati), and undertaken the creation of one new medical school (Toledo) and the subsidization of another (Case-Western Reserve). In addition numerous branches, community colleges and technical institutes have been founded under the same budgetary concept. This has enforced both the credibility and compliability of the system. In addition, the statewide resource analysis model, which has been operative since 1968 yielding comparative per FTE student cost, personnel, and space data across all institutions for seven course levels within some 60 discipline aggregates, has substantially improved the credibility of the system.

Obviously there have been many definitional changes in the evolution of both the uniform information system and the statewide planning programming budgeting system. However these have all been consistent with a long range goal of rationalizing the statewide investment in higher education instructional programs.

The system at the Ohio State University starts from a different premise but at the same time is translatable into both Regents' terminology and into Regents' philosophy. At Ohio State the basic premise has been that organizational units (departments, colleges, divisions) are the basis for program development, that certain short range changes in the operations of these departments can best be budgeted by central continuation program models, and that fundamental, radical and ~~long-range~~ changes are best handled by explicit, comprehensive, incremental plans where the alternatives as to methods of achieving goals are clearly identified and where, from a resource standpoint, new ventures clearly compete with existing ventures as well as among themselves.

This has taken form in terms of: identification of the fiscal responsibility for all resources with a specific department; reorganization (in 1968) of the academic departments into functionally related colleges; reorganization of the academic support units (student services and educational services) and general support units into functional roles (1969, 1970, 1971); the application of six-year planning to new or improved academic programs (1966) with biennial revisions (1968, 1970) and to administrative programs (1970); the development of academic workload models based on course enrollment forecasts and faculty service reports (1965) and their refinement; the development of administrative workload models in the physical plant and operations and maintenance areas (1971); and the development of intensive two-year, four-year plans with associated resource analyses for both academic and administrative operations in 1972. With the current structure all primary academic programs are the province of the Academic Vice President and Provost; all general support programs are the province of the Vice President for Administrative Operations and academic environment support programs receive their policy direction from the Academic Vice President and their operational guidance and direction from the Vice President of Administrative Operations. (The Executive Directors function as management staff to those two principal operating vice presidents.)

In part the continuity of the system has been proven in that it has been used throughout a period of substantial reorganization. This also speaks a bit to the question of compliability of the system. Figure 1 shows the general structure of the budget allocation process. The current funds budget, which has been administered by this process, has increased from about $126 million in 1966 (the first year of comprehensive budgets) to over $250 million in 1971-72. General unrestricted funds budgets represent the principal support for instructional programs, student services (other than housing and loans), learning resources and general support programs (other than construction of plant). These have received the most attention with respect to models and long range plans although notable progress has been made in some of the major auxiliary fund areas (dormitories, hospital, cooperative extension, athletics) and in trying in restricted

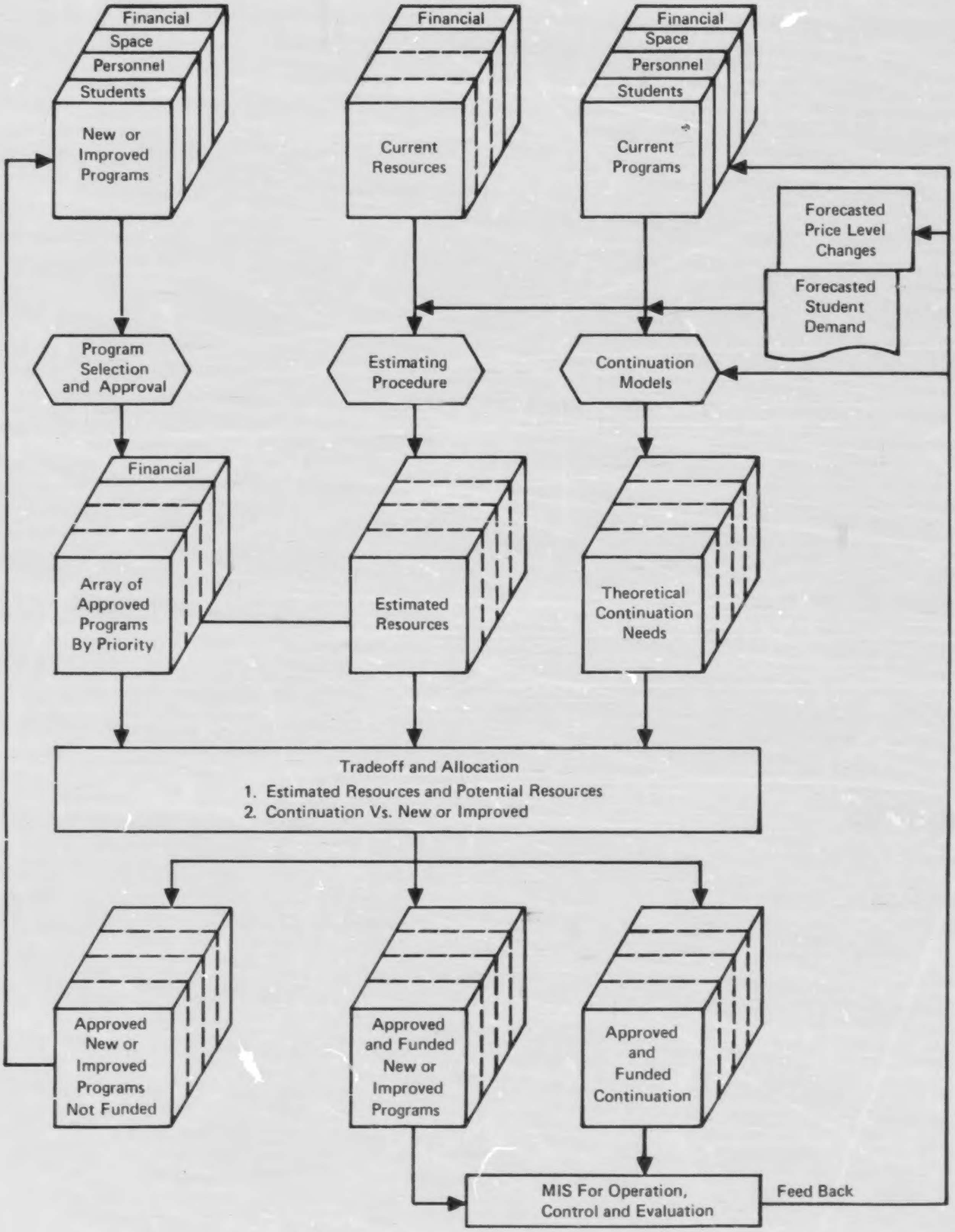
Financial
Space
Personnel
Students
New or Improved Programs
Financial
Current Resources
Financial
Space
Personnel
Students
Current Programs
Forecasted Price Level Changes
Forecasted Student Demand
Program Selection and Approval
Estimating Procedure
Continuation Models
Financial
Array of Approved Programs By Priority
Estimated Resources
Theoretical Continuation Needs
Tradeoff and Allocation
1. Estimated Resources and Potential Resources
2. Continuation Vs. New or Improved
Approved New or Improved Programs Not Funded
Approved and Funded New or Improved Programs
Approved and Funded Continuation
MIS For Operation, Control and Evaluation
Feed Back

Figure 1: The OSU Program Budgeting Allocation Process: For Continuation and New or Improved Programs

fund (e.g., sponsored research and public service) plans with general operations.

Over $25 million has been directed into new or improved programs in support of six-year plans since 1966 and includes support of such programs as:

1. Expansion and revision of professional programs in law, medicine, dentistry and veterinary medicine;
2. Development of new program areas in public administration, computer and information sciences, black studies, allied medical professions;
3. Major curriculum revisions in many undergraduate areas including individualized study in mathematics, nursing, biological sciences and allied medical professions, and greatly revised curriculum in education, music, theater, art, humanities, engineering, etc.;
4. Major consolidation and improvements in learning resources services, including an on-line library circulation system (now a phone call gets your book mailed to you), centrally supported computer-assisted instruction, and a mechanized information center;
5. General improvements in administrative support systems including automated student, financial, space, personnel, alumni, research and general stores systems;
6. A four functional center concept of computing to meet all major campus requirements.

Insofar as resources have indeed been directed to meet objectives over a long period of time the system has met the test of continuity and to a certain extent the test of credibility.

However the effects of the closing of the University in Spring 1970 and the subsequent difficult (18 months) legislative session with its very negative results seriously damaged the credibility of six-year new or improved program planning. For example, the aftermath of the spring closing required the reallocation of nearly $3 million. More than a third of this came from previously funded and approved new programs. The long delay in legislative funding meant that we were operating on two continuation program budgets for over six months in 1971-72 (Plan A – last year's resources, Plan B – modest increases for cost of living only).

Furthermore the University is, for the first time in its 100-year history, reducing enrollments to meet a legislated ceiling. This means that workload models in the academic areas are showing significant negative changes in nearly all undergraduate departments. In order to reduce the credibility gap between the six-year plans of early 1970 that were growth plans and the realities of planning needs for 1973-1977 which are for resource reallocation, the planning cycle was reduced to four years with particular attention to the 1973-75 biennium.

However the fundamental notions of decentralized fiscal responsibility, workload models (positive or negative) and specific incremental changes in accordance with a comprehensive long range plan have not changed. Thus the credibility and compliability of the system appears to have survived.

Currently the University is participating in a statewide management improvement program being conducted by the Ohio Board of Regents to develop manuals of best practice at the institutional level in program budgeting, personnel, institutional planning, data processing and student systems. This work is to be completed by June 30, 1973. Hopefully the 1974 installment of program budgeting at the Ohio State University and in higher education in Ohio will be able to address a full and integrated system that comprehends both institutional and statewide needs.

INSTITUTIONAL EXPERIENCE WITH PPBS: THE CASE OF FLORIDA STATE UNIVERSITY

Augustus B. Turnbull III
Florida State University

It is necessary to provide at least a modicum of historical and organizational context in order to understand the experiences Florida State University has had with the Planning Programming Budgeting System. Suspense can be eliminated by quoting a state official intimately familiar with the status of PPBS in Florida:

> Florida's budget process has moved away from line item budgeting in the past three years, but it has made very little progress in achieving the status of a program budget . . . . Florida's budget is an incrementalist document merely pretending to be a program budget . . . . Florida's planning effort is in deep trouble. Tied to the same format as the budget (which emphasizes dollars almost to the exclusion of program data) the planning process consists of very little more than a program structure with untested objectives.

Despite the pessimism implied by that summary it must be noted that Florida has made a substantial statutory commitment to PPBS. There is no indication that the effort to install a true planning-programming-budgeting system will be abandoned. In 1967, the Office of State Planning and Programming was established to "coordinate all state planning and programming activities." The Office was placed in charge of preparing a six-year, long-range development plan which was to be updated and evaluated yearly. The 1969 reorganization of the Florida state government, which made massive changes in the structure of state agencies, created a division with bureaus of planning and budgeting and requires "a budget system and related reporting and evaluation procedures to establish a plan for continuous planning and programming by all state agencies . . . ."

The 1972 legislature has just created a Division of State Planning, separating it organizationally from the budgeting function and elevating it to division status in the organizational hierarchy. The 1972 legislature also has declared that "the provisions of the plan shall become effective as state policy" and it has mandated that "state department or agency budgets shall be prepared and executed based upon and consistent with law and the state comprehensive plan."

Perhaps the key factor in this skeleton outline of legislation is that three times in the past five years the Florida legislature has acted to strengthen the mandate that the executive branch should get on with the business of planning and programming as a prerequisite for budgeting. It is not entirely an accident that the state official quoted above spoke just before the enactment of the 1972 legislation. In sum, the executive branch has adopted much of the form of PPBS, but has not imbued it with either spirit or substance, and the legislature does not seem to be satisfied with form alone.

THE STATE UNIVERSITY SYSTEM (SUS)

The organizational framework for education in Florida has been the subject of intense debate in recent months, but proposed organizational changes failed to pass the legislature. Retained was a somewhat unusual hierarchal system in which the State Cabinet sits as the Board of Education over one of its members, the elected Commissioner of Education, who presides over a Department of Education consisting of four divisions: the division of elementary and secondary education; the division of vocational education; the division of community colleges; and the division of universities.

Florida has long had a university emphasizing graduate programs, the University of Florida; a second institution, Florida State University, began its climb toward graduate status shortly after World War II. In the last few years the legislature has created seven new institutions in major population centers. Also in the last few years, the central office of the Board of Regents headed by the chancellor has assumed real authority over the separate institutions. This new authority is perhaps best symbolized by the action of the legislature which last year for the first time made appropriations to the State University System rather than to the individual universities.

The last five to ten years have been a period of enormous change and adjustment for the universities and for their personnel. Much of the adjustment has been focused on the realm of planning and budgeting.

PPBS AT FLORIDA STATE[1]

Actions in Relation to the State University System

The organizational structure just outlined implies some key political factors that have affected the development of PPBS in the State University System and in The Florida State University. As noted, the State System consists of two advanced graduate universities with a history of rivalry joined by seven new universities (located in populous and politically potent urban centers) whose primary mission falls within the undergraduate and beginning graduate area. Added to these institutions is a central staff which is trying to present the needs of the universities to the state legislature while simultaneously carrying the message of scarce resources to the universities. In addition, there has been a strong attack in the legislature on the very concept of an independent Board of Regents. Within this environment instituting a new method of decision-making has not been an easy task.

What has been done can be summarized very quickly. The State University System and the individual universities have adopted a modified program structure based on the WICHE model. Table 1 outlines a portion of the program structure as used by Florida State University in its budget request for the 1972-73 academic year.) The State University System also has put much effort into a refinement of its traditional formula method of budgeting and into efforts to

TABLE 1

Florida State University
Education and General Budget
1971-72

Program Components

3.43	Area Studies Instruction
3.44	Biological Sciences Instruction
3.45	Business & Management Instruction
3.46	Communications Instruction
3.47	Computer & Information Sc. Inst.
3.48	Education Instruction
3.49	Engineering Instruction
3.4A	Fine & Applied Arts Instruction
3.4B	Foreign Languages Instruction
3.4C	Health Professions Instruction
3.4D	Home Ec. Professions Instruction
3.4E	Law Instruction
3.4F	Letters Instruction
3.4G	Library Science Instruction
3.4H	Mathematics Instruction
3.4I	Military Science Instruction
3.4J	Physical Sciences Instruction
3.4K	Psychology Instruction
3.4L	Public Affairs & Svc. Instruction
3.4M	Social Sciences Instruction
3.53	Area Studies Research
3.54	Biological Sciences Research
3.55	Business and Management Research
3.56	Communications Research
3.57	Computer & Info. Sci. Research
3.58	Education Research
3.59	Engineering Research
3.5A	Fine and Applied Arts Research
3.5B	Foreign Languages Research
3.5C	Health Research
3.5D	Home Economics Research
3.5E	Law Research
3.5F	Letters Research
3.5G	Library Science Research
3.5H	Mathematics Research
3.5I	Military Sciences Research
3.5J	Physical Sciences Research
3.5K	Psychology Research
3.5L	Public Affairs & Service Res.
3.5M	Social Sciences Research
3.5N	Interdisciplinary Research
3.61	Continuing Education
3.62	Community Service
3.64	Radio/TV Stations
3.71	Libraries
3.73	Audio/Visual Services
3.74	Computing Support
3.75	Laboratory Schools
3.77	Farm and Dairies
3.78	Academic Administration
3.79	Textbooks and Publications
3.7A	Consultative Services for Academic Support Areas
3.81	Student Activities
3.82	Intercollegiate Athletics
3.83	Counseling and Career Guidance
3.84	Financial Aid
3.87	Residential Services
3.89	Services to Special Students
3.8A	Academic Advisement
3.A1	Executive Management
3.A2	Management Analysis
3.A3	Public Affairs
3.A4	Administrative Services
3.A5	Capital Facilities and Equipment Management
3.C	Fringe Benefits

make the formula method compatible with the concept of program budgeting.

In the refinement of the formulae, major emphasis has been put on improving the accuracy of the projections of student credit hours and on the development of a salary matrix model which defines average salary levels by disciplines, i.e., WICHE categories, and by levels of instruction. Table 2 outlines the formula for academic positions and illustrates part of the salary matrix model.) Other formula areas have also been given attention. The result to date is a mixture of sophisticated and quite crude factors in the budgetary formulae. For example, in addition to the sophisticated salary matrix model there is a complex formula for the allocation of library book monies. Yet in 1971-72 expense dollars were provided to each institution on the basis of an equal dollar amount per faculty member with no recognition given to the cost variances by program or level of instruction.

A number of problems have become apparent as a result of the efforts to bring PPBS into being in the State University System. First, there is a fundamental question of political strategy. Is it better to develop a budget estimate which "realistically" outlines the aspirations and needs of the institutions as defined by the institutions, or is it better to impose initial planning limitations from the top? The latter strategy is intended to ensure a final budget request which is not so far distant from the eventual appropriation as to destroy any credibility in the estimating process.

A second problem lies in the effort to reconcile the

TABLE 2

Florida State University
1971-72

A. Academic Positions Formula

Instruction (SCH per FTE Teaching Position)

Lower Level	405.29
Upper Level	282.24
Beginning Graduate Level	218.47
Advanced Graduate Level	91.46
Non-Resident	311.54

Research (FTE Teaching Positions per FTE Research Position)

Lower Level	12.00
Upper Level	12.00
Beginning Graduate Level	4.00
Advanced Graduate Level	2.00
Non-Resident	12.00

Public Service (FTE Teaching Positions per FTE Public Service Position)

All Levels	50.00

Academic Advisement (FTE Students per FTE Academic Advisement Position)

All Levels	250.00

Academic Administration (FTE Teaching, Research, Public Service, and Academic Advisement Positions per FTE Academic Administration Position)

All Levels	13.00

B. The Salary Matrix Model

Average Salary for Home Economics	**FTE Faculty Per Task**	**Task Weighting Factors**	
$13,671.64	2.7	.82 (Lower Division)	= $ 30,269
13,671.64	20.2	1.0 (Upper Division)	= 276,167
13,671.64	2.2	1.14 (Beginning Graduate)	= 34,288
13,671.64	2.2	1.14 (Advanced Graduate)	= 34,288
13,671.64	5.4	1.03 (Research)	= 76,041
13,671.64	0.6	1.12 (Public Service)	= 9,187
13,671.64	2.0	.98 (Academic Counseling)	= 26,796
13,671.64	1.7	1.27 (Administration)	= 29,517
		TOTAL	$516,553

traditional formula approach, in which all allocations are tied directly to estimated student credit hours, with a program approach in which the key decisions should be based on judgments as to the desirable levels of output. In the Florida system there has been as yet only a little explicit recognition that this problem exists.

A third problem is that since the budget process is based upon intricate formulae, very fundamental policy questions can be buried in what appear to be technical questions about student/faculty ratios or average salary by disciplines and levels or other minutia of the formulae. There is a great need to separate value judgments on policy matters from the mechanics of the planning and budgetary process. The essence of the decision-making process should lie in having the appropriate authorities decide in program terms what is best for the university, the system and the state. In a real sense this issue is related to the issue of the proper governance of higher education.

Here I refer to governance both in an institutional sense and in the broader context of decision-making within state government. The fundamental question is what officer or group has the authority and/or the appropriate expertise to make decisions about which outputs are desirable and which methods of producing those outputs are most effective. Until these fundamental, theoretical questions are at least made explicit, there can be no long range-progress in developing an effective PPBS.

A more technical problem is the rather common one of inadequate data. Individual institutions are having trouble developing adequate management information systems. In addition, the central office of the SUS has a difficult task in attempting to reconcile the different data bases at the separate institutions so that it can prepare a consolidated budget request and make reasonable allocation decisions to the individual institutions. One aspect of the data problem has been the requirement of submitting by program categories most of the same detailed line-item type information which was required under the old budget format. In effect, two contradictory approaches to budgeting have been grafted together, and the resulting paper overload has swamped most attempts at analysis.

The effort at putting together the 1971-72 budget under a compressed time table made necessary by an early meeting of the legislature made it evident to all concerned that these problems exist. Efforts have been made to seek solutions. Most notably an interinstitutional PPBS committee has been created. It consists of representatives from each of the nine institutions in the system and is chaired by the director of planning and evaluation for the SUS. It is too early, perhaps, to evaluate the effectiveness of this committee. Preliminary indications are that certain communication problems are being resolved, but that the more fundamental policy disputes among and between the institutions and the central office of the Board of Regents remain.

In sum, Florida State University in its relations with the State University System in the realm of PPBS has worked to adopt an effective modification of the WICHE PPBS program structure and in concert with its fellow universities, has sought to refine its traditional formula system and to improve the data base upon which planning and allocation decisions are based.

Internal Efforts

Perhaps more significant progress has been made within Florida State University. Here a significant organizational and political factor should be noted. At roughly the same time that PPBS was being brought to the state and the SUS, Florida State University was acquiring a new president, a new executive vice president, a new vice president for academic affairs, a new vice president for administration, and a new vice president for student affairs together with a whole host of new subordinate officers. Consequently, the institution was faced with a new decision-making process at the same time it acquired a large number of new decision-makers. In the midst of this turnover of procedure and personnel, it also became clear that over-optimistic enrollment projections had led the institution perilously close to deficit budgeting. Stringent recovery measures were necessitated. A clear-cut cause and effect relationship between these environmental conditions and what has taken place is not entirely possible. Nevertheless, several developments can be summarized.

Perhaps most important has been the move toward a system of complete, open and explicit analysis. The university has always considered its budget to be a public document, but the process and procedures for developing budget requests and making internal allocations had not been explicit. In an earlier era, judgments could be based primarily on informed intuition and experience rather than upon more formal analysis. It is not necessary to impune the quality of prior decisions in a prior era to note that new conditions require different techniques for making decisions.

The central administration of Florida State University in its new emphasis on open and explicit analysis has concentrated to date on the following.

First, it has worked toward the improvement of enrollment projections based on both an analysis of student demand for the various discipline areas, and on prescriptions as to where Florida State should put its emphases considering the strengths of its various programs and the needs of the state.

Second, it has attempted to quantify in meaningful terms how resources had been allocated to the academic disciplines in the past and then has considered these prior allocation patterns in making decisions in a program context. To a limited extent, informal estimates of output have been considered in these analyses. The assumption has been that most prior decisions were probably based on sound judgments at the time and that we should move very carefully and with due deliberation in altering allocations on the basis of the newer, more formal analyses.

Third, it has tried to make all of this data available to the deans and has encouraged the deans to make the allocation criteria known to their department chairmen.

Fourth, it has been wrestling with the fundamental question of campus governance in seeking to define the appropriate role of faculty members and administrators at the various levels within the university. As one symbol of this concern, a Faculty Advisory Committee on the Academic Budget has been established to work with the Vice President for Academic Affairs in considering budget criteria and procedures.

While Florida State has been reshaping its planning and budgetary decision processes, some hard budget decisions have been made. To balance the budget, hundreds of thousands of dollars had to be cut from the annual operating budget. Formal program analysis had some part in these reductions, but the role played by such analysis in the early stages when the fiscal crisis was at its peak was necessarily limited in nature. A major program decision, however, has resulted in closing one of its ten schools, the School of Engineering Science. In addition, a number of faculty positions have been returned to the State University System for reallocation to institutions which have been growing more rapidly in student enrollment. To secure these positions and to address internal needs, a number of shifts of human and financial resources have been made. More and more these decisions are being based on estimates of what kinds of outputs are desirable and how these outputs can best be achieved.

WHAT OF THE FUTURE?

It seems safe to predict that PPBS will continue to exist in Florida state government and in the State University System. Continued action at the state level is essential if the agencies are to have sufficient confidence in the merit of PPBS so that they will continue to make it more and more an integral part of their decision-making process. Clarification of the role of planning and budgeting as two new and separate divisions is an obvious need. Within the State University System, there is a fundamental need to be more specific in defining the scope and mission of each institution so that there can be clear objectives to guide the decision-making process. In addition, the process of better defining the responsibilities of the Board of Regents, of the Chancellor and his staff, and of each individual institution as a constituent part of a coordinated State University System must be continued.

The fundamental question of governance needs answers in Florida as it does elsewhere in the nation. What are the proper roles of the faculty, the students and the administration? How do these roles differ as we move from the level of an individual department to a college, to a university, to the system, and then beyond, as faculty, students and administrators alike face decision-makers within the larger state government.

The problem of developing an adequate data base for decisions regardless of the process decided upon has not yet been solved and will remain a major concern for some years.

Over and above these admittedly difficult questions are two others that Florida State shares with the whole realm of higher education. These are the need to better define the outputs of higher education and the need to develop a better system for predicting with some assurance the change in output which will occur when a unit of resources is added to or subtracted from the input side of the equation.

In summary, Florida State University has begun to think and act in program categories, but it has not yet moved very far down the road of predicting and evaluating the educational outputs of its programs.

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1. This analysis is based primarily on planning and budgeting for the 1971-72 academic year. The process was considerably different in 1970-71 and some significant procedural changes are expected for 1972-73. The substantive problems outlined, however, can be expected to endure for some time.

UNIVERSITY COSTING – THE ONTARIO EXPERIENCE

Bertrand L. Hansen
Council of Ontario Universities

The title of my presentation, "University Costing – The Ontario Experience," requires some clarification. Universities in Ontario are independent institutions. There are and have been developments in unit costing at some of the universities which they could report on better than I. I know that Western Ontario and Waterloo have made some progress. York University is developing a program. And there are others. In my early experience at the University of Toronto during the period of 1966-68 we developed programs and documentation for forecasting workload by program and through a crossover matrix related the program workload to departmental resource requirements. I haven't been close to information systems at Toronto for some time, but as far as I know these programs are packed up in boxes gathering dust. I will not go into the details of why this is so except to say that mission-oriented research and development leading to improved program accounting systems requires extensive commitment of resources, substantial grass roots level work, and management backing. For various reasons these commitments have not been maintained.

Thus, I will confine my remarks to the specialized nature of universities and what this means in relation to unit cost determinations.

THE SPECIAL NATURE OF UNIVERSITY COSTS

Cost has a special meaning in universities. Universities are spending institutions. Allowing for reserves, they will literally spend all the money they get. In periods of expansion, certain programs are promoted (often at the urging of government and society), investments are made, and the resulting unit costs of these programs may increase at faster rates than unit costs of other programs. New programs will always cost more because of high start-up costs. In periods of contraction, the same rate of decrease is not possible because of long-range commitments and the essential character of the university, that of commitment to acquisition, transmission, and preservation of knowledge. In that sense, the university is establishment. Thus, unit cost is a resultant of many force vectors, not the least of which are fairly rapid adaptation during expansion and rather slower adaptation during contraction. We all know that old programs contract slowly and die hard.

WHAT KINDS OF COST ARE WE TALKING ABOUT?

If we are going to use the unit costs, how are we going to find them and what will they be used for? Presuming that we could find agreed-upon historical and current unit costs of programs (and I don't think we can ever achieve these to everybody's satisfaction), would these be the *desired* unit costs? To what extent are historical costs appropriate as standards for the future? There is no profit motive in the university; therefore there is a natural inertia which inhibits rapid change in unit costs except as regards new programs. This is to say that even if governments were to radically alter their funding formulas which usually fund graduate and professional students at higher rates, sometimes 3 to 4 times as much as undergraduate arts and science, the change in unit costs would not be reflected immediately but rather slowly over time. Put in another way, funding universities by an artificial formula which gives the same weights to undergraduate students as graduate students would not produce immediate adaptation. If the same level of total funds were granted, the change would take place slowly because the external funding formula exerts a long-range steering effect; it is interpreted by the university community as an external value system. If lower levels of funds are granted (and this is usually the reason governments are attracted to eliminating the differences) the same inertia will obtain; universities will get less money but the differences in unit costs of programs will change very slowly. Rather hesitatingly then I would say that I favor placing greater weight on the historical differences in unit costs in the first instance of establishing an external funding formula and then looking at the needs of society over the 5-20 year range for the formula that would be most appropriate for that period. It would be understood that the formula would be undergoing review regularly during the five-year term and that the most appropriate formula for the next five-year term would be designed during the period. I might note that we have had a formula of the expansionist variety in Ontario for the past five years. Many of us believe that the same kind of formula would not be appropriate for the next five years when enrollment growth is likely to be far different.

How are we going to use cost information at the university level? Suppose we could get accurate cost information by program. Suppose further, for example, that because of a naturally low enrollment in East Asian studies, the unit cost of production of an undergraduate degree student in this program is $40,000. Suppose also that the unit cost of production of an undergraduate degree student in sociology is $4,000. Even given that we may have fairly accurate cost information, without an objective function, constraints, and profits, how do we decide how much of which to produce and whether or not we should suppress or close out one or the other of the programs? May I suggest that we don't need accurate cost information for this decision. We know, without doing a precise costing, what the relative unit costs are; for example, they are highly correlated to average class size. The problem is not one of precise costing but rather one of forming a value system over and above unit costs which provides the proxies for profits. Then we have payment for programs by the funding agencies, approximate unit cost of programs determined either by correlation estimates or by approximations to unit cost determinations, and the application of the value system to aid in allocation of new and released resources and reallocation of existing resources.

Value systems vary from university to university, from one post-secondary sector to another, and the value systems of the post-secondary institutions may not be the same as the value system interpreted or misinterpreted by government as most closely representing the public's. It goes without saying that the public's system of values changes with major technological developments and with the level of taxation. I think there is real danger to the meaning of the university in the thesis that there can be a rigid, vertical hierarchy of objectives, sub-objectives, programs, and sub-programs for which information can be aggregated at whatever level desired for rational decision-making. It just isn't that simple unless you are willing to make military organizations out of universities. Going back to my example, I would not like to see universities lose the right to make the decision to maintain East Asian studies at the expense of sociology. They should be aware, however, of what it is costing them to do so.

PROBLEMS IN UNIT COSTING

I should like to list briefly the problems that I see in attempting to collect unit costs, including problems of human relations.

One problem arises with the decision to collect data to provide unit cost information. This is immediately interpreted as a threat to autonomy by both university administration and faculty. They fear losing decision-making power and erosion of a way of life. They know that what they interpret as a major benefit of higher education, that is, a very long-term return to the individual and society, is virtually non-quantifiable. This benefit will thus have a neutral value in the cost/benefit computation. The decision will then quite naturally be made according to the criterion of lowest unit cost. We might speculate parenthetically on the present condition of the U.S. and Canada in respect of the supply of East Asian scholars to help with the opening up of Red China if this unit cost criterion had been used for the past 20 years. We could not have possibly quantified their present benefit 20 years ago. Similarly, we cannot now quantify the benefit of Islamic studies 20 years hence. The university communities are fearful of yielding up to the government and the public value systems which now allow them to make this kind of choice. What this means is that if you support traditional university values, top-down program budgeting is to be avoided. This is not to say that it is to be avoided *per se.* You can't argue with its logic. But the program analysis must begin at the grass roots and it must be carried carefully through necessary committee work. Also, the matrix of programs and resources must be very carefully worked out with regard to authority and responsibility. We must also recognize that probably 30% of our faculty are anti-quantitative; they have absolutely no use for mathematical manipulations and in fact attribute much of what is wrong with society to excessive reliance on such manipulations. In their view, no information is the best information.

A second problem arises in definitions. What is a program? What is a full-time faculty member? What is a full course load? What is a full-time student? It is not until you start examining these definitions that you find they are at this time non-comparable from institution to institution. Bearing in mind the necessity for involving faculty in the process, the first step is to get to work on devising common definitions. If you have to work at the system level as I do, this means getting subcommittees with faculty and administrative involvement to hammer out the definitions for students, staff, space, facilities, finances, library resources, etc. Once these definitions have been agreed upon it is necessary to establish at what level the data elements should be maintained – department, faculty, university, system, government – the hierarchy I referred to earlier.

A third problem is the program classification structure. Development of a taxonomy of programs should proceed in parallel with improvement of definitions. The major functions of a university are instruction, research, and public service. The major supporting services to support these functions are student services, academic support, administrative support, and physical plant support. In the NCHEMS system this is the highest level of program aggregation.[1] It is really a functional level. As Stearns points out in his discussion of the Georgia program classification structure, the university and academics are not programmed.[2] Both can point to long traditions and neither accepts completely the attempts to program them. Thus, some sort of structure which reflects the function-related character of universities is essential. The system should be capable of mapping from lower levels into conventional degree programs which require inputs from all functions and also into the traditional university functions.

We have a two-phase effort going on in Ontario to improve financial information. This has been a grass roots effort of the financial officers at Ontario universities. The first phase of improved financial reporting has developed through the first stage where functional costs are reported to the provincial government according to agreed-upon definitions. The second phase, in conceptualization now, embraces the development of a unit costing methodology which would relate resource inputs to the programs selected for the classification structure.

In my view the major hurdles in this development will be difficulties in obtaining agreed-upon definitions of programs, breaking out the joint processes of teaching and research to apply differentially to programs, and allocating indirect costs of libraries, computers, and audio-visual resources to direct programs. Using the Ph.D. in Asian studies as an example of a direct program, government may fund this at a unit weight of six, that is six times the level of the general degree (core program). This may be a program the university supports completely. That is to say that there is no sponsored research; if there were no students there would be no professors, no instruction, no research, and no future public service. With only a few students, how are the professor's costs allocated between research and instruction? In a faculty activity survey, a questionable instrument in itself, how does the professor separate out processes which he considers inseparable? Any separation must be arbitrary. If left to the department head, the separation may have to be done in an even more arbitrary way – we hope not a frivolous way. I should like to make the point here that professors and department chairmen are for the most part responsible people. They want to respond to necessary questions if they are logical. By the same token, if you ask them to break out processes they consider inseparable to programs they have had no part in determining, you cannot expect serious responses, willing cooperation, or respect for your intentions. Arbitrary decision rules will be developed but they leave something to be desired. They will be, of necessity, short-term. For the most part, governments don't look at the long term; they look at the date of the next election. With respect to our previous examples of investment and carrying costs of an East Asian studies program, how do you allocate this to this year's students, next year's students, or students in 1985? Suppose computers are involved in the development of linguistic programs. How are these costs allocated? I'm not trying to be difficult. I am suggesting that unless *arbitrary* allocation mechanisms are used to satisfy the demands from above, the results could vary greatly. Actual relative costs could be 12 times the core program or 2 times or something in between with none being completely satisfactory to all parts of the academic community. Thus, we retreat to arbitrary rules whose limitations I have tried to show.

My past experiences caution against proceeding too rapidly in the development of unit costing systems. First, information tends to beget more information and we get into a vicious cycle of always needing more. I recall how all Department of Defense Secretary MacNamara had to do was put out a tentative document on information needs and this was translated to all lower levels as demands for information with a concommitant enormous flow of resources to satisfy the requests for information. I'm sure there is an undeveloped law which states that demand for information and resources is intensified at exponential rates as it is translated downward to lower echelons. Also, it seems to me we are dealing with changes which can be classified as generational changes. Program budgeting systems, for example, presume a generational change. Accounting people in our universities will have to maintain conventional accounting systems for the foreseeable future. Overlaying another system at the same time that funds to universities are stabilizing means that resources will have to be transferred from other programs (instruction, research, libraries, etc.) to build the bureaucratic systems.

Another of my experiences has been with PERT and CPM systems. In my view their greatest value was in the rigor they brought to the planning process – the necessity to look at all alternatives and to set these alternatives down in logic diagrams. As soon as managers attempted to use the techniques for control and feedback, the information that was necessary to do so became prohibitive and not worth the cost. I suggest that we will nullify the good work that NCHMS, Georgia, and others are doing if we proceed too hastily in implementation to satisfy the intense but sometimes ill-conceived demands of governments and legislatures.

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1. Warren W. Gulko, "Program Classification Structure," Technical Report No. 27 (first edition), Western Interstate Commission on Higher Education, Boulder, Colorado.

2. A. A. Stears, "Costing Principles in Higher Education and Their Application" (preliminary draft), University of Georgia.

THE REFORMATION OF GOALS AT NORTH CAROLINA CENTRAL UNIVERSITY: A CASE STUDY

Edward A. Nelsen
North Carolina Central University

In examining the files of the late Dr. William Brown, my predecessor in the Office of Research and Evaluation at North Carolina Central University, I was struck by a particular paragraph introducing one of his letters written in the mid-sixties:

> This is an era of revolution in American education beyond the high school. Practically all institutions of higher learning are under pressure to make sweeping innovations in the purpose and process of college education. The smaller and less affluent colleges in the South, attracting as they do large numbers of students from poor homes, schools, and communities, are especially hard pressed to come up with innovations that fit their limited resources. Yet, these institutions are most vulnerable to the charges that higher education needs to be more efficient, more realistic, more purposeful, and more challenging. For the small college, improvement in these terms implies increased resources, or redistribution of resources, or a sacrifice of breadth of program for greater depth, or some combination of these and other courses of action. In short, the problem of developing these colleges presents many alternatives that must be carefully weighed by each college as it makes the blueprint for its development.

I was impressed with this eloquent call for reevaluation of goals in developing institutions. The statement reflected an understanding of the special needs and problems of the predominantly black university, as it faced the challenge of providing a liberal arts education for students from poverty backgrounds. It also reflected an orientation toward the future and a recognition of the necessity to adapt to a changing world, and it indicated a readiness for reconsideration and reformation of institutional goals.

It is certainly beyond the knowledge and foresight of any one individual to chart the course of the reformation. And I don't know of any institution that has been restructured or achieved a basic stability of function to the extent that it can be said to have completed the reformative process. But many institutions have undergone and are still undergoing marked changes and transformation, so that the evolutionary process has been accelerated.

I believe that North Carolina Central University is among these institutions. NCCU, as a predominantly black institution with a changing role in a changing society, has thoroughly reexamined and revised its goals during the past five years. It has also revised its curriculum to a considerable degree, and it has established a number of new programs which are, if not revolutionary, certainly dramatic educational improvements.

I will attempt to characterize the reformation of goals at NCCU during the past five years, placing particular emphasis upon the role of research on goals in the context of institutional development, administrative leadership, and planning. I will attempt to highlight both the contributions and the limitations of the research on goals, based on experiences at NCCU. Finally, I will offer a number of recommendations or principles concerning conditions and stragegies for using variations of the Institutional Goals Inventory and the Delphi technique to their fullest potential in the context of programs to reexamine institutional goals.

Let me begin with some background information on our institution. NCCU was founded in 1910 by James E. Shepard as the National Religious Training School at Chautauqua. In the mid 1920's, the institution was turned over to the State of North Carolina, and in 1925 it became the nation's first state-supported liberal arts college for Negroes. Dr. Shepard remained as president until his death in 1947; this fact illustrates reliance upon a single strong administrator and educational leader that was typical of most Negro institutions during this period.

In the early and mid 1960's NCCU was beset by turmoil resulting from a change in administrations, and in 1965 the president was asked to resign, after which an interim committee governed the institution for a year and a half. Other important changes were also taking place during this period. The racial composition of the institution was changing, with the enrollment of a small number of white students and the employment of a considerable number of white faculty members. This was a period of marked change, uncertainty, and insecurity. The institution was in a state of crisis or disequilibrium, which implied a state of readiness for certain basic changes, if not "revolution."

A new president, Dr. Albert N. Whiting, was appointed in 1967. During his initial months at NCCU, President Whiting and the core of administrative leaders at NCCU conducted a thorough review and analysis of the needs, characteristics, and potentialities of the institution. This analysis proceeded at both the informal and formal levels. The views of students, faculty, previous administrators, and alumni were solicited in informal discussions, in addition to more formal studies, data, and documentation.

On the basis of his analysis of the institution's needs and potentialities, President Whiting outlined in his inaugural address in 1968 a set of goals for the institution, with emphasis on student involvement, positive relationships among students and faculty, compensatory programs for disadvantaged students, the relevance of knowledge to the lives of students, stimulation of intellectual aspiration and curiosity within the campus community, development of a campus environment conducive to personal growth of students, and increased involvement in community needs.

During the ensuing years, new programs were instituted at NCCU, including the establishment of an academic skills center for providing remedial training to students with academic handicaps; a review and revision of the core curriculum into a general education program providing greater flexibility and latitude among students' choices; establishment of an extension education and community services division; initiation of a long-range plan for development of the physical plant and campus environment; and establishment of a task force to prepare goals for institutional development and a private giving program to support this development.

In the 1969-70 academic year, a study of institutional goals was proposed by Dr. Norman Uhl, under the joint sponsorship of Educational Testing Service and the National Laboratory for Higher Education. NCCU was one of five schools asked to participate in the study. NCCU had done several studies of its goals within the context of the above developments, but this study was unique in a number of respects. First, it employed a preliminary version of the Institutional Goals Inventory, a newly developed instrument which is perhaps the most comprehensive and systematic measure of a wide variety of goals for higher educational institutions. Second, the IGI was administered to samples of alumni, trustees, community members, administrators, faculty, and students representing an unusually broad range of constituents. Third, the study employed the Delphi technique, in which each participant was given feedback regarding the responses of all other participants on successive administrations. That is, following the initial assessment, results were fed back to the participants, their opinions concerning goals were reassessed and fed back again. Finally, they were assessed a third time to determine whether their opinions concerning institutional goals had converged to a point of substantial agreement.

This pilot study was instituted to evaluate the preliminary version of the IGI, and the effectiveness of the Delphi technique for achieving convergence. The study was not explicitly undertaken by NCCU as a basis for revising goals, although we hoped that the information would be useful in the planning process and that it would give us added insight into the goals of NCCU.

The detailed results of the study for the five schools in the pilot study are reported in a monograph by Uhl;[1] Therefore, I will give only a general overview of the findings. The profile of goals for NCCU is shown in Figure 1.

Briefly, the areas which the respondents agreed were most important as desirable or preferred goals for NCCU were: intellectual development of students; self-study and planning; esprit and quality of life; concern for good image; personal development; and vocational preparation. Areas regarded as less important were religious orientation, national and international service, and nonacademic activities.

The results on the IGI for NCCU were not markedly different from those for other institutions in the study, but there were modest differences in certain areas. In comparison with the other four institutions, NCCU was higher on the preferred importance of concern for good image, nonacademic activities, personal development, and local and regional service. NCCU was slightly higher on religious orientation in

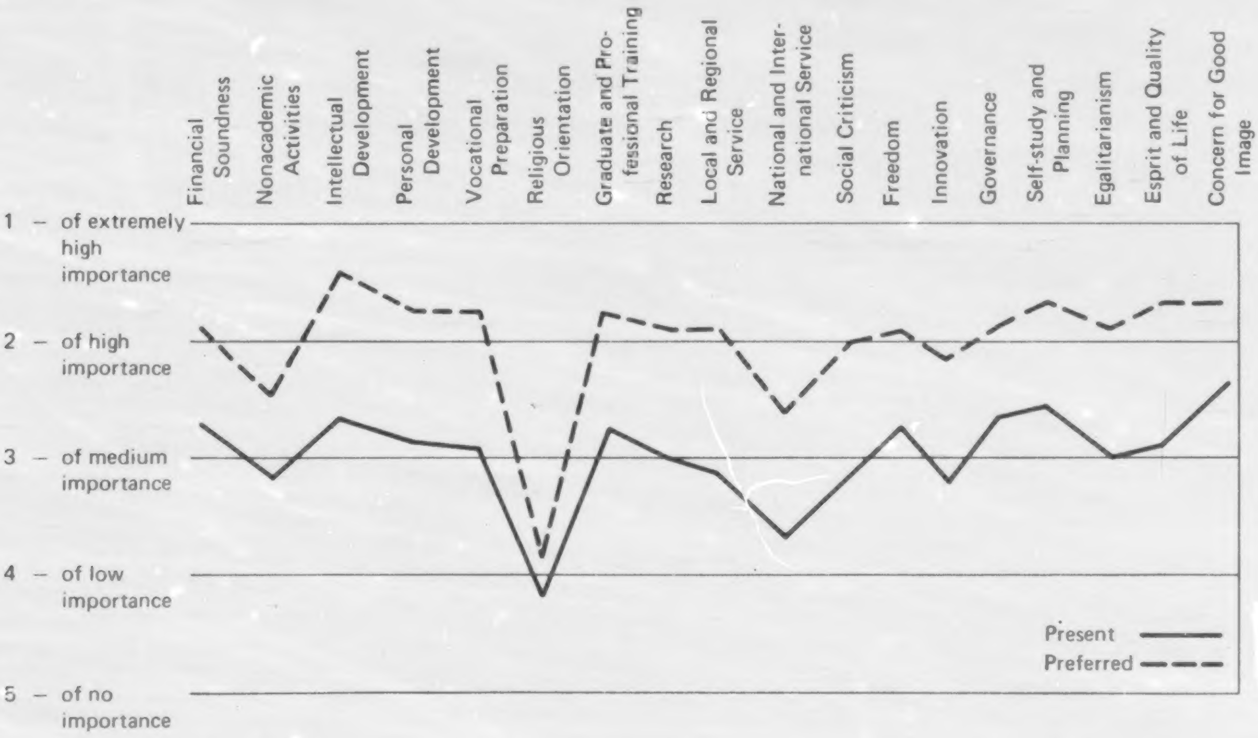

Figure 1. Profile of NCCU Goals Comparing Mean Responses to Present and Preferred Importance of Goal Areas from Third Questionnaire[2]

comparison with the two other public institutions in the study, but lower than the two private, church-supported institutions. In any event, the results were not contrary in any marked sense to the expectations of those familiar with the institution. Administrators at NCCU agreed that the results of the study were about what they had expected, with relatively few surprises in the data. This was supported by validating evidence in Uhl's study.

The "good fit" of the results with prior expectations and knowledge of NCCU is evidence of the validity of the instrument, at least on an intuitive or perceptual level. Secondly, the good fit was evidence of the prior understanding and insights concerning institutional goals at NCCU.

With regard to the effectiveness and impact of the Delphi procedure, it was reported in Uhl's monograph that substantial consensus was achieved in virtually all of the goal areas. That is, the responses of most participants were in reasonably close agreement on the third administration.

First, it should be noted that the initial administration of the IGI did reveal several instances of substantial agreement or divergence involving institutional goals revealed on the initial administration. For example, the trustee group diverged apparently widely from other groups on several particular goals. The divergence stimulated discussion and reconsideration of these goals, and ultimately greater consensus was apparently achieved.

Second, since the consensus achieved on the final administration was generally congruent with the goals and plans previously formulated by the leaders at NCCU, the data had a reinforcing or supportive effect in confirming and communicating their views. The data suggested that respondents were saying, "We are on the right path, and we are together."

After the study was completed, there were a number of occasions in which the data were cited by administrators as a referent for resolving disagreements. For example, in one planning session, the deans of several schools argued that their programs should declare quite distinct sets of goals, particularly with regard to greater emphasis on community service. When it was pointed out this was among top priority goal areas for the total institution, they recognized and accepted the more general statement of goals. This agreement may have been significant, not so much in the confines of that particular decision, but in stimulating the broader consideration and understanding of certain commonalities and relationships among goals of the various schools and departments, and within the institution as a whole.

Unfortunately, however, there were relatively few instances in which data were used in this manner. In general, the administrators I spoke with did not feel that the data had substantial impact upon their thinking or that the findings made a great deal of difference in their actual planning for the institution. Why?

First, it must be remembered that this was a pilot study. We had no particular expectations for utilizing the data in the actual goal-setting process, and the direction of the institution had been pretty well established before the study was completed. Second, there were some unanswered questions regarding the methodology of achieving consensus and the interpretation of the results. For example, when respondents agreed with the overall mean that was fed back to them on the second and third rounds of the study, was it a result of the "power of suggestion," or "conformity to the group?" Or was there a more basic and long-lasting shift in attitudes or values that might be viewed as cognitive restructuring?

Of course, these questions could not be answered within the confines of this initial pilot study. Much additional research will be necessary to resolve these issues. However, I might point out that Norman Uhl has collected data in a follow-up study, which may answer, in part, some of these questions. He readministered the IGI to the same faculty and administrators one year after they had completed the original study to determine the stability of consensus and attitude changes that had taken place. Unfortunately, the results of this study are not yet available.

Another limitation of the data from the IGI, noted by administrators at NCCU, was the lack of a conceptual framework for interpreting the results. What do the data mean? For example, the discrepancies between the present and preferred ratings were greater for NCCU than for any other institution. Does this mean there is greater dissatisfaction, or does it mean there are higher aspirations regarding institutional goals? Or did it result from a different response set among participants? Of course, many other conceptual issues could be raised, and many alternative interpretations are possible. I simply indicate that administrators are asking for some type of conceptual framework for interpreting the data.

It may have been premature to provide a conceptual framework along with a pilot study such as this, which was primarily concerned with methodology and instrument development. But I would argue that the development of an instrument such as the IGI should not get too far ahead of the fairly rigorous conceptualization of the phenomena the instrument purports to measure. The danger is that the instrument that evolves will provide much data, but not enough interpretable information.

Another aspect of the study that highlights the need for a conceptual framework for using the instrument is the implication to some participants (especially those with little administrative experience) that the results can be directly adopted as institutional goals; *i.e.*, that consideration of the results is the primary step a decision maker might pursue in setting institutional goals, establishing programs, etc.

Why is this a misleading assumption? First, some administrators, trustees, and faculty members will point out that they have been specifically appointed and given the responsibility for decision making, policy making, and directing the institution, and they cannot abrogate that responsibility in favor of an unsanctioned collective judgment. Certainly students, faculty, alumni, and community members should have more input and assume greater participation in the decision-making process. The Delphi technique with the IGI provides one means for broadening this participation. Certainly most persons responsible for decision making would agree that they must be aware of the collective opinions, needs, values, and goals of their constituents. Not to be aware and sensitive to these issues would be poor leadership and poor education.

However, administrators and trustees may be reluctant to adopt a collective judgment because they may feel that it could be superficial or based on a limited perspective. Without getting deeper into this complex issue, I will cite just one example. One administrator said that even if there were a consensus that NCCU should become an exclusively black institution, with programs designed and developed to serve black students only, he would feel compelled to reject and oppose this kind of policy – first because of the law of the land, and second because he would disagree with this goal on moral and practical grounds.

Actually, this would be an unlikely occurrence if the Delphi technique were used, because it tends to reduce or eliminate such conflicts and divergencies, especially if clear, rational arguments can be fed back to the participants.

However, there remains a potential danger that in the collective results for an institution, narrow or short-range goals could overshadow highly innovative goals, especially if the Delphi technique were omitted and the initial results were accepted, or if the Delphi procedures were administered superficially, *i.e.*, with insufficient feedback and inadequate opportunities for analyzing and reconciling differences.

I want to emphasize the importance of distinguishing between the consensus achieved on the instrument and the more formal policy-making roles of trustees, administrators, faculty, and student governing bodies, boards, and committees. I believe there are many steps from presentation of the results of any study of goals to the informal and formal adoption of actual institutional goals, not to mention their translation into specific objectives and programs. These steps represent a series of checks and balances which provide certain complications, along with certain safeguards.

In summary, I wish to suggest that our experiences with the IGI and the Delphi technique have been very valuable, even though they have not basically changed our directions or had substantial bearing upon the actual goals of the institution. The study has stimulated considerable discussion and analysis regarding the goals at NCCU, and it has shown us a means for broadening participation in the decision-making and goal-setting processes at the institution.

For administrators planning to undertake a review of goals, I might offer the following principles or guidelines for utilization of the IGI and the Delphi technique to their fullest potential:

First, *consider the institution's readiness for change.* I suggested earlier that NCCU was in a state of disequilibrium and transition. Reformation of goals is potentially most effective under these conditions. Signs and/or causes of readiness for change might include widespread dissatisfaction or conflict among constituent groups and policy makers, a sudden increase in turnover of faculty and/or changes in administration, marked changes – either increases or decreases – in funds available, and other general attitudes such as a desire for a change.

Second, *the instrument should not be administered without some preparation of participants.* Ideally, the context for restructuring goals will be set for the total constituency through both formal and informal discussions, seminars, meetings, self-studies, etc., to generate a higher level of awareness and readiness for taking the instrument. This will help increase interest in the results, gain informal support for changes, and ultimately achieve formal adoption of the goals agreed upon.

Third, *the impact of a goals study will probably be greater in proportion to the breadth of participation.* A sample of limited size was used at NCCU, thus limiting the scope and intensity of interest in the study. Full participation by all constituents is costly, but should have greater institutional impact.

Fourth, *if the goals instrument is administered without the systematic feedback of the Delphi procedure, or if the feedback in a Delphi procedure is inadequate, there is a danger that the results will represent superficial opinions.* This issue was discussed above and will not be elaborated on here.

Fifth, *the impact will be greater in proportion to the extent of formal and informal reinforcement and supplemental support activities prior to, during, and especially after the study.* Our experiences show that the results don't necessarily speak for or implement themselves. They must be interpreted, discussed informally, and processed formally before they can have significant impact upon the goals of the institution.

In conclusion, our experiences have shown us that the process of reforming goals and achieving change within a given institution is complex, cumbersome, and slow. It requires understanding of the institutional resources, needs, and potentialities; of the faculty, staff, students, and other constituents; and of the social psychology of organizational change. Within this context, the Institutional Goals Inventory, if administered within the methodological framework of the Delphi procedure, can play a significant role in helping an institution restructure its goals and programs.

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1. Norman P. Uhl, *Identifying Institutional Goals,* National Laboratory for Higher Education Research Monograph, no. 2, Durham, North Carolina, 1971.

2. This figure is taken from Uhl, *op. cit.*

WHAT CAN THE TEACHERS' UNION ALONG WITH INSTITUTIONAL RESEARCH DO TO IMPROVE HIGHER EDUCATION?

Dr. Israel Kugler
President, United Federation of College Teachers

The growing acceptance of college teacher unionism and collective bargaining on college and university campuses occurs at a time when institutions of higher education are being transformed by a change in the nature of the student body and by the national fiscal crisis affecting the very viability of colleges and universities. While the basic impetus for the growth of unionism is grounded in the insecurity associated with the glut of Ph.D.'s in the academic marketplace, the vindictive nature of mindless legislators, and the erosion of economic status by the ravages of inflation, the existence of a union and a collective bargaining agreement have had a profound effect on the institutional arrangement at colleges and universities.

The entire power structure has been modified. Traditionally, the semblance of faculty authority in departments, senates, and councils had been bolstered by the shortage of college staff in the post-Sputnik period. With budgetary stringency, an end to the shortage of personnel, and the resurgence of anti-intellectualism, the older forms of faculty input have become increasingly devoid of content. Firings, denials of tenure, promotion, sabbaticals and research grants, mandated increases in workload, and weakening of tenure and due process, all are increasingly occurring by administrative, trustee and legislative fiat. Faculty governance, because of its intra-mural advisory nature, has been reduced more and more to a meaningless charade.

Collective bargaining elections involving the choice of an organization or no organization by the majority of ballots cast in secret may provide representation for the entire faculty, whether members of the winning organization or not, on the level of equality with the employer, *i.e.*, the university administration and trustees. All 50 states are covered by the National Labor Relations Act for private institutions with an annual income in excess of a million dollars. Public colleges and universities are involved under state public employment statutes. Thus, a legal umbrella has encouraged the growth of college unionism.

Equality at the bargaining table requires that bargaining be conducted in good faith. Proposals must be met by counter-proposals. Substantiating data must be produced if these are relevant to such demands as compensation, workload, and fringe benefits. And here is a relatively new area of work for institutional research. It is coupled with a great challenge of providing data on the basis of integrity and honesty.

The heart of any contract is the grievance procedure assuring due process to all members of the staff, tenured and non-tenured. The final step of this process is outside, impartial, and binding arbitration. This has had a profound effect on the faculty. It has encouraged honest forthrightness in all institutional arenas. Instead of tailoring remarks and activity in genteel conformity to assure reappointment, promotion, and tenure, the protective nature of the grievance process removes anxiety and encourages creativity and constructive dissent. Paradoxically enough, a product of a collective effort assures the individualism of the professional practitioner.

The power thrust of collective bargaining has caused fearful administrations to attempt to undermine the process by artificial resuscitation of faculty senates. Even student organizations have been pitted against faculty unions. The legally binding contract assures, however, that no change can occur in terms and conditions of employment, compensation, and grievances without prior negotiations with the bargaining agent.

The union, as an organization of employed professionals, is vitally concerned with the quality of education and enlarged opportunity for such an education. Most if not all of the demands are intimately related to this concern. A decent workload, adequate office, secretarial and telephone facilities, professional compensation, research grants, democratic governance, academic due process, job security, *etc.* are all elements of an educational ecology which makes the transactional process of teaching and learning take place under optimum conditions.

Thus, the union has regarded some form of higher education as a critical necessity in today's complex and technological society. It has advocated stipends equal to the minimum wage for the youth of poor families so that they can avoid the necessity of taking deadend menial jobs. Recognition has been granted to the enormous educational cost attached to open enrollment in terms of adequate counseling and remediation services if the revolving door of flunkouts is to be avoided.

The union has enlisted the aid of other sectors of the labor movement to lobby vigorously for adequate federal, state and local aid to public and private institutions of higher education. Thus, in the face of recurrent crises, the union has played a notable role in arresting deterioration of our hard-pressed institutions.

The union as an independent force is able to articulate needs more completely and in a public fashion. Furthermore, the union has the ability to marshal political constituents so that the legislators may be aware of the consequences if they fail to support higher education.

When colleges and universities apply for governmental aid, particularly at the local and state levels, we confront a peculiar political pliability on the part of institutional administration. In making up the budget one finds that administrations trim departmental requests, acquiesce in informal conferences with county boards, mayors and governors to further cuts, and then formally agree to still more slashes. Finally, when the politicos are through with funds for the college or university, the actual budget bears little resemblance to the originally stated needs. Then the administration's response is often one of guarded appreciation with the usual statement that the institution can live with the budget.

Of course, this means in the face of sustained high enrollment, increased workload, and heavier reliance on teaching assistants, a deterioration of educational quality. The politicians take to heart the administration's statement that the institution can remain viable under a severely truncated budget and assume that this fiscal level is a working norm. It also creates in government officials' minds a credibility gap causing them to believe that college and university administrations tend to inflate budget requests.

Where does this leave institutional research? Should it be a handmaiden to the politically pliable college administrations? Or should it call the shots on the basis of sound educational standards? These questions again raise the issue of integrity and professional autonomy of institutional research. The union, for one, would defend this independence as a facet of academic freedom.

In the set of bargaining demands, the union has been mindful of the need for institutional research even beyond the areas of providing hard data for bargaining and computing costs for adequate budget support for capital and operating costs. Thus, one contract calls for an annual outlay of $500,000 for travel, $1,500,000 for faculty research support, and a $1,000,000 for sabbatical leaves. In the form of proposals for re-negotiations, the union at the same institution has asked for $3,000,000 in research support and sufficient funds for the granting of annual sabbaticals for 1/7th of the instructional staff.

We regard institutional research as critically important for honest and independent evaluation of the institution's activities; and this bears repetition. At one university, there are several programs designed to provide admission avenues for students of economically deprived families. To these programs an open admissions policy was added. An existing evaluation and research unit which had a record of hard-nosed independence was phased out because its analyses did not fit the public relations preconceptions of the administration.

We repeat again, institutional research at a university must exist in an atmosphere of academic freedom. This refers to the day-to-day set of working conditions where professionals may pursue their various functions with integrity and autonomy. To the extent that unionism and collective bargaining tend to create this milieu, then institutional research is aided and advanced.

We are employed professionals whose clients are living human beings – students. As *individual* employees, we depend upon the individual good graces of the administration. Collective bargaining, however, substitutes a rule of law for a rule of men. It thus redresses an important human imbalance.

We must overcome the identity crisis which associates unions and bargaining with blue-collar workers or even with our parents' generation.

In today's national workforce, the white-collar professional is playing an important role as society gravitates from production of goods to the greater provision of human services. As a result of this shift the character of the labor movement is changing and teacher unionists will play a key role.

The institution of free collective bargaining and unions is indissolubly linked with the existence of colleges and universities in a free society. When the lights of freedom are extinguished by totalitarianism, darkness descends upon all of us – unions and colleges.

Our credo, "Democracy in Education – Education for Democracy," associated with one of our great founders, John Dewey, represents the imperfect yet the best atmosphere for making our students become all that they are capable of being.

BUILDING NEW PROGRAMS ON THE ASHES OF THE OLD

F. Craig Johnson
Florida State University

Traditionally, institutional research studies relate purposes to basic institutional processes which include teaching (curriculum and instruction), research, service and advising, and the supporting processes of resources allocation and space utilization. The gap between processes and purposes is measured and general conclusions are reached about the internal consistency of processes without much regard for their validity. This tradition has served well in an affluent decade of growth when institutions were able to build around problems rather than solving them.

Today, planners must consider reformation and reallocation in higher education in a decade when new programs must rise from the ashes of old ones. Techniques and traditions to accomplish this are not now available to planners who must consider the possibility of disestablishing old programs or colleges to make resources available for the new. Some principles which are available from related areas (such as management science) can be applied and to some extent will probably be useful. But past experience with these principles indicates that the absence of a profit motivation limits their applicability.

THE ISSUES

Before discussing possible approaches to the new problem of reallocating fixed resources, several fundamental issues must be addressed. The first is: To what level should institutions delegate the operational responsibility and authority to reallocate resources? Much of our administrative information flow has traditionally gone from lower operational levels to higher administrative levels for decision-making. The direction of this flow developed during a period when decisions involved getting new resources and information was used to justify additional expenditures. Today, consideration needs to be given to the issue of whether that same direction of information flow is appropriate when decisions involve program reduction. The proposition that should be addressed assumes that the person closest to the operation is the one best able to make the best judgment about the essential and the extraneous. Perhaps it is time to reverse the flow of information to the operational level so that frontline administrators can make decisions consistent with central policy.

A second kind of issue that needs to be considered is whether or not, when a percentage cut is required (say 10 percent), one cuts *out* 10 percent of the programs or cuts *down* all of the programs by 10 percent. This basic decision needs to be made by central administration. Institutional research may be enlisted to collect data and to present implications of cutting out 10 percent of the programs or cutting down each program 10 percent. If the decision is made to cut out 10 percent of the programs, then that cutting must be done centrally. If on the other hand the decision is made to cut down each program 10 percent, the option exists to let the cutting be done at the operating level. The integrity of institutional research in these new kinds of decisions becomes vulnerable and it may itself be cut out. A very careful and defensible analysis needs to be made of implications resulting from following either of the two ways of cutting resources. A simple process analysis won't do. The analysis must be expanded to include objective observable evidence on the input and output of each activity, program, or college, in addition to traditional process analysis.

THE ANALYSIS

What might a complete analysis of input, process, and output look like? In examining teaching there are two processes traditionally considered. The first is curriculum and the second is instruction. In curriculum, the university through its governance mechanism assigns credits to courses. The document from which one gets the basic input data is the catalog. The output document is the transcript. Careful transcript analysis shows that program cost is not necessarily related to department cost. A department may present a proliferated list of courses in the catalog and a lengthy published set of recommended courses, yet when transcripts are studied, it is determined that the department itself actually enrolls a rather limited number of majors in courses taught by them. This is possible because students elect a large proportion of their course work in other departments. It is only from an analysis of the output, in this case the transcript, that one can determine where the true costs are and how cuts in degree programs will affect departments.

In instruction we have the process of assigning tasks to students and then evaluating performance on those tasks. The assignment, or input, is recorded in the syllabus which normally is on file for each course. The output measure, which can be documented, is the report of grades in the course. Grades are imperfect records of learning, and a closer look at the course examination which produced the grades might yield more insight into the instruction than does the syllabus. The identification of programs which overlap and possible cost reductions are more likely to come from an analysis of the examinations than from course syllabi.

Research is difficult and necessary to evaluate even in affluent times, because research problems are assigned to faculty members who represent a large share of the resources that institutions can reallocate. Looking again at the documents of research, the input is a proposal and research reports are the output. While no one is very comfortable suggesting that any research activity should be curtailed or that one kind of research should be pursued rather than another kind of research, a careful analysis of research reports may identify areas of low yield, whereas an analysis of the proposal or the amount of time a faculty member spends in research may be inconclusive. Peer evaluation of output is critical.

If research is difficult to analyze, service is even more complex. In most service functions, facilities are assigned to service directors. The input is requests for the service and the output is the delivery of that service. One can look at the books that have been requested in a library and the books that have been used. In a computer center one might look at the core memory that is available for use and the core that is actually requested by priority users. It is very difficult to do an internal evaluation of service because its purpose is to support output from many other activities. But a consideration of delivery as output of service is possible. Traditionally, student services concentrate 80 percent of their delivery on undergraduate students who are on-campus residents. The changing nature of our universities suggests that many more students live off campus, are married, and with new legislation attain their majority by the time they arrive on campus. The delivery system needs to be analyzed to see whether or not the demand for that service is appropriate to the delivery.

Advising students is a constant problem everywhere. Advisers are assigned to students; somewhere between the input of an application for admission and the output of a degree awarded, students make decisions facilitated by a process known as advising. Traditionally, institutional research concentrates on the hours faculty members spend advising and the reaction students have to a particular adviser or a particular program of advising. Perhaps, when the time is related to degrees granted and bad advising is defined as the gap between actual and optimal time spent by students, there might be a way to reduce the cost to education and make advising accountable. But in times of limited resources it is more critical to have good advising directed at getting students to attain degrees efficiently and effectively. This is complicated by many students today who believe that a university is a place for them to "find themselves" and "do their own thing." If this is a purpose, then our institutions must change and be provided support for withholding of a certain number of students from the work force to allow them to find themselves. Universities and colleges are more acceptable institutions than prison or welfare, but universities cannot account for this new purpose except as an inefficient degree path.

Other outputs are produced by facilitating processes of financial resources allocation and space utilization. The documents for financial resources are budgets for input and expenditures for output. Money is provided for administrators, who are held accountable for that money. Program budgeting gives program labels to budgeted items but typically does not give those same program labels to expenditures. Expenditures use object codes instead of program codes. Additional problems are created by a failure to allow operating units to retain position control. It is not the program that is dictating needs, but rather external accounting requirements for positions and funds in standard categories that prevent flexibility of operation and careful analysis of program costs. Nevertheless, we need to look at expenditures to see whether or not these expenditures have been used for program purposes and goals. Cutting budgets is painful; cutting expenditures is agony. But more sensitivity is needed to cut expenditures without damaging educational programs. Again the issue arises as to who should cut expenditures and how these expenditure cuts should be administered. It is more expedient to do it centrally and by large categories ("pull the telephones off the wall"). But often a department or operating unit can make decisions which will not hurt the educational program, but that might seem irrational to someone in a central position of administration.

Finally, an examination of the matter of space utilization is needed. People are assigned to rooms, but scheduling is quite different from occupancy. New buildings are justified not on scheduling but occupancy. While this is true in any administrative unit for any organization, it becomes particularly critical in educational units where the room size directly affects the educational program itself. This is critical when the number of people who can stand around a laboratory table safely is set by fire regulations; or when the number of nurses who can observe patient care around a particular bed is set by hospital standards; or when the number of art students who can arc weld is limited by available current. The constraints imposed on the occupancy of the space determines the enrollment as well as the point at which occupancy is going to be a factor in closing out a particular program.

It is not enough to say that research now needs to concentrate more on outputs, although that is true. But what is often left unsaid is how those particular outputs are related to reallocating resources.

PRINCIPLES

In the decade ahead, a system of information must be developed which provides considerably more feedback to decision-makers at lower levels and allows them to make the routine adjustments that are necessary to reallocate resources. This system should be open. Although secret budgets were never desirable, there was some justification in having them – everyone anticipated an increase, although some received more than others. Now, however, when cutting is involved and certain programs must be eliminated if others are to be built, everyone must pay some price for a new program. Under these conditions, guidelines, rules, operating procedures, and data should be fully disclosed to all involved. Anyone who has gone through the bloody battles of cutting a program knows that anxieties, conflict, and distrust reach a high peak which can undermine the entire educational enterprise. Anxiety can be reduced if full and open disclosures are made of the criteria by which programs are cut. Furthermore, these criteria will be more acceptable if they are output criteria rather than process or input criteria. One very wise academic dean put it well when he said "It's best to trust everyone, have faith in their ability, and have an audit every six months." It is not pleasant to plan destruction. Contingency planners must all feel a bit like Dr. Strangelove from time to time, but it is a fact that preparing alternatives in hard times is a good deal less appealing than dreaming up alternate futures when all the indicators are up. An example follows.

One state university in the last year has been involved in an intensive self-study. No one expected major reallocations to result from the self-study, but many routine economies were effected because operating units were given sufficient information. The self-study provided each administrative unit all of the data needed to complete this study before that unit began. By the time the departmental reports were submitted, 80 percent of the change that the study was going to yield had occurred due to direct action taken by departments. Very little of this action was contained in departmental reports; but in personal interviews it was found that department after department had had problems brought to their attention, had found solutions through open discussion, and had taken action without recording it in the self-study document itself.

For the first time the salary system was opened up, and each department's graduate, undergraduate, and research program was evaluated, along with an evaluation of every administrative unit in the entire university. These evaluations were done by asking students, faculty, and administrators to give opinions on each unit. Then each unit was given the full disclosure of what its unit evaluation was and the opportunity to look at the evaluation of all the other units in the university. There were few complaints about the evaluation, and nobody seemed to notice that the entire salary system had been opened up for the first time. The faculty, students, and administrators, as intelligent, concerned professionals, were able to examine problems and not be concerned that information was being withheld from them. Everyone was aware that this was an open system and that their colleagues and peers would be looking at the evaluation that had been made of their department. If that evaluation was low, there was no need for a dean or a vice president to call it to the attention of the department; departments were aware that everyone know where everyone else stood. This openness was a healthy and rewarding aspect of the self-study process, making it possible to reallocate and reform resources and to continue an open system by giving responsibility for routine reallocation to operating units.

Finally, it is clear that the role of the institutional research office will have to change if it is to be useful in hard times as well as in affluent times. Few administrators have been trained or have had much experience in operating in adversity. Offices of institutional research can be of immense help to these people if they can concentrate on outputs and the flow of information back to operating units.

THE TRADE-OFFS

In planning the reallocation of resources, the trade-off of each strategy needs to be given careful consideration. As institutions gain more experience with the management of growing organizations and reduced dollars, the trade-off analysis will sharpen. At this point in time, several of the following strengths and weaknesses of each approach should be considered.

1. When decisions are made to plan program reductions at the lowest administrative level, there is a gain in the probability that the least critical parts of the enterprise will be lost. On the other hand, there will be a strong tendency to preserve the *status quo.* The definition of what is critical will be based upon the past rather than the future, but the healthy survival of the unit will be more possible.
2. The coding of outputs for better planning sharpens the evaluation of the program, but complicates the process and increases the probability for errors in accountability. The training of clerical personnel to code accurately is vital and costly. Systematic training programs need additional personnel.
3. Control by policy rather than by approval gives operating units the creative autonomy needed to adjust to changing conditions. At the same time, it is difficult to establish policy statements, especially when the governing boards are not well informed about operational details. Today many groups, including students, faculty, and parents, are becoming more concerned about policy formation. Often the conflicting views among these groups render the policy formation process ineffective.
4. People who are involved in the original decisions need less supervision in the enforcement of the implementation. The time consumed in reaching consensus on complex issues is great; many administrators long for a day when a president can reach a decision and rely upon faculty to implement it without taking more time to discuss it than it would to act on it.
5. Finally, the open system does reduce the anxiety about information possibly being withheld. At the same time there is the possibility that new anxieties will be created when the irrational aspects of decision-making are exposed.

All things considered, it seems best to base the planning of resource reallocation upon trust in lower-level operational decisions, coded outputs, policy control, involvement of operational units in decisions, and an open system. A more workable if somewhat less elegant solution is likely to result.

THE ALLOCATION AND REALLOCATION OF FINANCIAL RESOURCES TO UNIVERSITIES

Jerry Rust
Tennessee Higher Education Commission

Repeatedly you have heard in more ways than one that the honeymoon is over for higher education. In most speeches concerning higher education the speaker stresses: accountability; competition for the dollar at both the federal and state levels; and the need for efficiency in higher education. Some have even gone so far as to discuss the measurement of this efficiency or inefficiency and to talk of abolishing academic programs and/or administrative offices which are not relevant to student needs. This concern should have surfaced years ago.

Among governmental units, the states have had the primary responsibility for the development of higher education throughout our history; and the Carnegie Commission concurs:

> That this responsibility generally has been well discharged is demonstrated by the quantitative and qualitative growth that has given this country a position of world leadership in higher education. The states, in the 1960's in particular, gave spectacular support to higher education in the face of a "tidal wave" of students. Their greatest previous contribution came about a century ago when the landgrant universities were being born.
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> The states should continue to carry the primary governmental responsibility for higher education they have borne historically. They have done well with it Their guardianship has led to substantial diversity, to adaption to regional needs, and to competitive efforts at improvement.[1]

At the state level competition for the public dollar is strong, and higher education must compete with social welfare programs, public health, mental health, and others. Growing needs and insufficient tax funds require a more thorough review of the tax dollar. Legislators have also realized that they are strategic decision makers in policies affecting higher education as stated by the Carnegie Commission in *State Officials and Higher Education:*

> The resources mobilized for colleges and universities, the goals to which such resources are allocated, and how they are distributed depend to a great extent on the views and decisions of the nation's legislative bodies. Legislators intervene in higher education not only through conscious planning but also through the inadvertent consequences of legislative action, or inaction, in such related areas of public commitment as agriculture, mental health, social welfare, and defense.[2]

In addition to the legislative and executive branches of state government considering alternatives in higher education, the general public may at last be examining the rewards of the bachelor's or other degrees. Though I may be called a heretic, the Ph.D. or Ed.D. no longer guarantee anything, especially a job. While many young Ph.D.'s are looking for work or are working in positions not in their academic areas, the university may be continuing its struggle to initiate more degree offerings without evaluating the current or future need.

For a better understanding of the financial crisis in higher education, a brief look at the past ten years is helpful. Earl F. Cheit in his Carnegie Commission report, *The New Depression in Higher Education*, states:

> The decade of the 1960's was characterized by the most rapid growth and development of institutions of higher education in American history. As the postwar babies reached college age, not only did the college-age population rise to unprecedented numbers, but the proportion of these young people seeking higher education also rose steadily. In the post-Sputnik era, moreover, there was a heightened appreciation of the contribution of higher education to national growth and scientific development, which encouraged rising state government appropriations, massive federal aid programs, expanded private gifts, and increased student fees. Thus institutions of higher education were equipped financially to absorb the swelling enrollment of students. But toward the end of the 1960's, signs of financial stress began to be apparent in the work of higher education, and by 1970 increasing numbers of institutions were facing financial difficulties as the flow of funds from various sources ceased to rise at the rapid rate that had been experienced from the late 1950's to about 1967. There has been a clear connection between the extraordinary growth of the first seven years of the decade and the financial stringency that began to emerge toward the end of the decade. Not only had enrollment at both the undergraduate and graduate levels been mushrooming, but institutions had increased the quality and variety of their course offerings and had responded to the demand for greater equality of opportunity in higher education by increasing their expenditures on student aid and by developing special programs to facilitate participation in higher education of students with less than adequate preparation. Other highly significant factors in rising costs were the increase of graduate students as a proportion of the total enrollment and the rapid growth of expenditures.
>
> All these factors, plus accentuated inflation in the economy, contributed to sharply increasing costs of education per student.[3]

This financial crisis has replaced student unrest as one of the most important current educational topics.

Growth in public higher education has led to the need for some state level coordinating agency among the legislature, the executive offices, and the public colleges and universities. Establishment of this agency inevitably transfers the focus of decision making in some areas from the individual college or university to the coordinating agency. This does not damage the institution's autonomy or interfere with the institution in providing a climate conducive to learning. Furthermore, if this work is not performed by the state agency which is familiar with the college and university and their problems, then the work will be performed by those who are not acquainted with educational problems and in a most dispassionate manner.

Fiscal management is only one of the relationships between state government and higher education; however, it has become one of extreme importance in a time of greater demands for the dollar. Among others there are two important methods of centrally distributing funds which we should review: (a) cost analyses procedures, and (b) budget formulas.

Cost analysis includes a review of past expenditures as a part of the procedure for preparing future budgets. An advantage here is that the institution and the state agency gather data which can be used for other management purposes. This procedure has become popular in many states and is generally accepted as an objective method of fund distribution. Dr. James Miller describes two broad types of budget formulas as:

> . . .base formulas and functional formulas. In both types the major functional activities such as instruction, administration, and library operation are identified. In a base formula the direct expenditures for instruction are termed the "base" expenditures and expenditures for other activities are dealt with as percentages of this base, that is, library expenditures might be 8 percent of instructional expenditures and operation and maintenance of the physical plant 27 percent. In a functional formula anticipated expenditures for each activity are determined through a consideration of factors directly relevant to the activity itself, that is, library expenditures might be based upon such factors as the average cost of books, the number of books, and average salaries for professional librarians. Some states adhere strictly to a base formula as does Oklahoma or to a functional formula such as in California and Texas, but some other states employ a mixture of the two in which some activities are dealt with as a percentage of the base while others are dealt with in terms of their particular workload factors as is done in Florida, Kentucky, and Tennessee.[4]

Most cost analyses and formulas include the detailed study and/or the forecast of expenditures in those traditional functional expenditure areas: instruction and departmental research, library operations, physical plant maintenance and operation, general administration, general institutional service, student services, extension and public service, organized educational activities, organized research, and other – if applicable.

These functional areas represent the educational and general expenditures of the institutions. Two important items are excluded from this listing. These are student aid and auxiliary enterprises.

With the increasing use of Management Information Systems, both state agencies and institutions can gather unit cost data which hopefully can make planning a systematic search for and evaluation of new alternatives.

In Tennessee, state appropriations for public higher education institutions in 1961 were approximately $20,000,000. In 1970, this had increased to $93,000,000 and in 1972-73 will be approximately $126,000,000. Ten years ago the state was following a formula based primarily on FTE students projected by the institutions with very little control on the part of state officials. This type of budgeting was almost out of hand in 1966-67 when enrollments were overprojected by as much as 3 to 4,000 students and approximately 3 to 4 million dollars.

In 1970, the Tennessee Higher Education Commission in cooperation with the governing boards and institutions carried out an Instructional Cost Study in order to determine the expenditure pattern for each institution for the academic year 1969-70. The long-range goal of the study was to develop data which could be used as a basis for the development of a formula for the distribution of state funds to all public colleges and universities.

The appropriations formula includes six functional categories: instruction and departmental research, libraries, maintenance and operation of the physical plant, general administration, student services, and general institutional expenses. These six areas account for about 90 percent of the unrestricted educational and general expenditures in most institutions.

The area of instruction and departmental research alone comprises 55 to 60 percent of an institution's unrestricted educational and general expenditures; therefore, efforts were concentrated in developing the formula in this area. The basis for the formula came from the fall 1969 Instructional Cost Study in which we accumulated cost per student credit hour for each institution using 33 standardized academic areas and 7 course levels for the following types of instructional expenditures: faculty salaries, clerical and supporting salaries, supplies and other expenses, and equipment. Actual expenditures were also collected for libraries, maintenance and operation of physical plant, general administration, general institutional expenses, and student services. A formula was developed for each of these expenditure areas. In each situation the formula was so developed that the total expenditures for 1969-70 were reflected in the formula.

Having determined a base from which to project 1971-72 expenditures, increases of 10.4 percent for a two-year period of inflation were added to produce a continuation budget.

The formula assumes that all institutions are to be funded at the same level for similar programs. This has been accomplished for the expenditure side of the formula by using the same rates per student credit-hour for all institutions for similar programs.

The income side of the formula was balanced by averaging maintenance fees and other student charges and applying a uniform revenue rate by academic course level to each institution. Out-of-state tuition was charged each institution at a uniform rate of $200 per quarter. Other revenue was projected by each institution.

Specific calculations for expenditures other than instruction and departmental research were as follows.

a. Library expenditures were calculated for each student credit hour by level assuming the following ratio:

1 – Lower level – freshman and sophomore;
2 – Upper level – junior and senior;
4 – Master's level;
8 – Doctoral level;
6 – Law;
1 1/2 – Remedial education;
1 1/2 – Continuing education.

Library deficiencies were also determined for each institution and should be eliminated over a ten-year period for a continuation budget.

b. Maintenance and operation of physical plant expenditures were divided into the total academic educational and general space to arrive at a formula base and 10.4 percent was added to develop the rate for a continuation budget.

c. General administration, general institutional, and student services expenditures were combined to develop the following formula for each institution: $221 for the first 3,000 headcount students, $199 for the next 3,500 headcount students, and $188 for all headcount students above 6,500.

d. Organized educational activities was considered a non-formula expenditure except intercollegiate athletics which was funded at no more than $150,000 in state funds in those institutions where such programs are not self-supporting. This excluded the University of Tennessee at Knoxville and Memphis State University.

e. Other separately budgeted research, extension and public service, staff benefits, sponsored research, and other sponsored programs are non-formula expenditures and were evaluated for each institution.

f. Student aid expenditures were added to the formula whereby institutions will receive student aid funds in relation to the percentage of their student body from low-income families ($5,000 or less). For the continuation budget, $70 per low-income student was allowed.

Public institutional funding must be provided in a manner which will respond to the needs of the student, the local community, state, regional, and national needs. Faculty members, administrations and boards (including Commissions) are still selfish, power stricken, and narrow minded. More often than not the needs of the student are secondary.

Growth demands with a slowing economy, combined in many cases with a fixed relatively small tax base, give a smaller share of the state revenue to higher education. To add to the seriousness of the problem, executive offices and legislatures are looking askance at public higher education institutions; and even though Tennessee has had few if any major student demonstrations, bills are still introduced in the legislature which attack both student and faculty rights, demand more work, and rebuke institutional administrations.

The slowdown in student population increases has brought a period of program evaluation. Faculty are more in supply than demand and austerity is the word to think about.

There are several methods of funding public higher education from the state level. Centralization and decentralization of state funding presents extreme positions and though we think more in terms of centralization, decentralization has merit and will continue to receive considerable attention. Formula funding is used by a majority of the states and may or may not involve cost analyses. In Tennessee we attempt to fund academic programs by area and by course level based on cost analyses.

The alternatives for the future include a more serious attempt to evaluate outputs as well as inputs. The need for compatible data between comparable institutions is great and can be accomplished with the management tools and techniques available today to administrators in higher education.

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1. *The Capitol and the Campus,* The Carnegie Commission on Higher Education (New York: McGraw-Hill Book Co., 1971), p. 1.

2. Heinz Eulau and Harold Quinley, *State Officials and Higher Education,* Report to the Carnegie Commission on Higher Education (New York: McGraw-Hill Book Co., 1970), p. vii.

3. Earl F. Cheit, *The New Depression in Higher Education,* Report to the Carnegie Commission on Higher Education (New York: McGraw-Hill Book Co., 1971), p. vii.

4. James L. Miller, Jr., *State Budgeting for Higher Education: The Use of Formulas and Cost Analysis* (Ann Arbor: University of Michigan, 1964), pp. 104-106.

ALLOCATION OF RESOURCES WITHIN AN INSTITUTION OF HIGHER LEARNING

Paschal Reeves
University of Georgia

One of the persistent myths of academia is that every central administration has a secret fund which, like the widow's meal barrel that nourished the prophet Elijah, is both inexhaustible and self-replenishing. This popular myth also maintains that if one screams loudly enough and thumps often enough upon the right desks, then the hidden treasure may be tapped. Many faculty members and most students seem to have accepted this myth implicitly. Every administrator must have wished at some time that it were true, but unfortunately this popular myth is the sheerest fantasy. The resources which come to an institution are indeed finite, often are severely limited, and never are sufficient to meet the accumulated demands upon them. The wise allocation of these resources is the crucial task facing the central administration and calls for the most thoughtful and careful planning.

Since the budget is the fiscal expression of the goals and aspirations of an institution we may center our discussion of internal allocation on budget development. Whatever the procedures employed in the funding of an institution may be, the budget becomes the expression of how those funds are to be utilized. Thus, regardless of the source of funds, whether public or private, the institution is faced with many internal problems in allocation. While the request for funds may be based on student enrollment, semester or quarter hours generated, immediate needs, or long-range plans, and may be expressed as a formula allocation to the institution, the same method will not necessarily apply internally. While the translation of student enrollment into instructional load can be determined, enrollment alone, or credit hours alone, are not sufficient guides for internal allocation, nor can the best flow of quantitative data, no matter how carefully generated, expertly sifted, and judiciously analyzed, provide any quick or easy formula that will obviate the necessity for making hard judgmental decisions.

Increased size and complexity of an institution only compounds the difficulty of decision-making. The functions of the modern university are threefold: instruction, the dissemination of knowledge; research, the generation of new knowledge; and public service, the extension of knowledge to the sponsoring society. The strength of the institution is found in the scope and diversity of the programs it offers at all levels. This variety is greatly increased if in addition to an undergraduate college, the institution also consists of graduate and professional schools. Yet there are certain fundamental needs and principles that apply from the junior college through the more sophisticated graduate institution. It needs a budget which expresses its programs in dollars and estimates the income necessary to finance these programs. The budget thus becomes the primary instrument of fiscal control and should contain all anticipated income and expenditures of the institution.[1]

While various procedures have been followed in budget development, the traditional method has been to break the process into three separate phases or cycles: a preliminary or planning phase, a final budget phase, and the operating phase.

1. *Preliminary or planning cycle.* "Development of a preliminary budget consists principally of estimating the income and the expenditures for the next fiscal year. It is ordinarily based upon estimated student enrollment and projected credit hours. These estimates usually include such considerations as increasing needs due to inflation, costs to continue the existing level of support, the need to strengthen or expand existing programs, and the desire to establish new programs."[2] Preliminary budgets are frequently used as the basis of requests to funding agencies and as such they sometimes are overstated in the anticipation of possible reduction. A preliminary budget unrestricted can become a wishbook for deans and department heads, that if allowed to be unrestricted can become more a dream and less a plan. In order to get realistic figures it is usually necessary to place a proportional restriction on requests that may be submitted. These budget figures are best accompanied by narrative accounts which state clearly and concisely the needs and conditions upon which the request is made.

2. *Final Budget.* The development of the final budget phase consists of translating the proposed budget into a detailed allocation for the next fiscal year. This phase can only take place after the allocations are received by the institution and its total funds are clearly known. It is at this point that the funneling of all pertinent information is brought to play, and the decisions are made by the budget committee as to which proposals will be funded. The necessity for detailed, accurate and comprehensive data at this stage of budget development cannot be overstated. Regardless of the planning that has gone into the preliminary budget, and the continuing analysis of a superabundance of data, every administrator must at some time feel that he is forced to make final decisions based on inadequate information. Even under the best of conditions the desired information is sometimes simply not available.

3. *The Operating Cycle.* Once the budget has been developed and approved by the authoritative board and placed into operation, it still should not be regarded as too sacred to touch. The institution needs the flexibility to make periodic revision as conditions change. The ability to amend the original budget is essential to the efficiency and wise management of the institution. Some type of contingency fund is indispensable.

In addition to its operating funds, the needs of an institution are almost too numerous to mention. Adequate provision must be made for the maintenance, modification, and additional construction of its plant. In addition to all pertinent information such as priorities, square footage, cost per square foot, maintenance cost, size of unit, faculty and student demands, one needs a crystal ball to determine the best use of limited resources to meet demands, many of them not yet articulated.

The problems of resources allocation within institutions are determined in part by the controlling psychological climate which has prevailed in institutions of higher education since World War II. The post-war baby boom and increased demands made on educational institutions to solve the problems of society, resulted in continued growth in the 1950s and 1960s in a climate which was generally supportive. Generally, the heads of budgetary units were called upon to provide more instruction for more students, to meet more research and service needs. This situation was largely met by the traditional method of incremental increases to meet additional needs.

The rapidly changing demands of society and the major emphasis being placed on accountability are forcing institutions to look at all aspects of traditional academic life; to re-evaluate programs and to re-examine the institutional objectives and aspirations. Too many of us have continued to add programs without ever phasing out weak or outmoded ones, and we now find ourselves in a position where the cost of continuation may well exceed the available resources. Therefore, the necessity for alternative methods may be more imperative than we realize. Unless we in higher education are willing to set our house in order someone else will do it for us.

Let me mention two different approaches with which my own institution is currently involved. Shortly after the new Governor of the State of Georgia took office he sent to the heads of executive agencies a memorandum which specified that all state agencies would adopt the concept of "zero-base budgeting" for the fiscal year 1973. This concept as adopted by Governor Carter ". . . requires each agency to analyze and justify its entire appropriation request in detail and therefore shifts the burden of proof to the agencies to justify why they should spend not more funds, but any funds. This procedure requires that all functions or operations be identified in 'decision packages' which will be evaluated and ranked in order by systematic analyses. A decision package is an identification of a discrete function of operation in a definitive manner for management evaluation in comparison to other functions including the consequences of not performing that function, alternative courses of action and costs and benefits."[3]

"The ranking process attempts to provide management with a technique to allocate its resources by answering two questions: (1) What purpose or goal should we attempt to achieve; and (2) How much should we spend in this attempt?"[4] Zero-base budgeting thus calls for justifying the entire base starting at zero and justifying every dollar in the base instead of accepting the base and justifying an incremental increase. This method of budgeting allows the funding at any specific amount, at 80% or 90%, and decision packages above that amount are therefore excluded from funding. Needless to say, zero-base budgeting which was applied to all units of the University except resident instruction, caused considerable soul-searching and a re-examination of goals and priorities.

Another method of which we have all heard much in recent years is the PPBS (Program Planning and Budgeting System). In 1970 the University of Georgia was awarded a three-year Ford Foundation grant to assist us in developing and implementing a program, planning, budgeting system for higher education. "Our principal goal was simple in concept if not in execution: namely, to give the President of the University a tool which would permit him (1) to develop explicit objectives, (2) to devise programs which will effectively reach those objectives, and (3) to make financial planning – both long-range and short-range – an integral part of the process."[5] We hope in this manner to be in a psoition to weigh the conflicting demands for limited resources and to devise a just and efficient method for allocation. This, of course, would involve a restructuring of the existing budgeting and planning procedures into a PPB system. Since we are in the second year of the three-year project, we are only beginning to establish models which can be implemented in selected colleges of the University, but we have strong hopes that this project will provide us with a better understanding of the needs and a better method of allocation of resources.

Under the traditional method of object budgeting there has not existed the freedom in allocation that is widely believed to be held by central administrations. In incremental budgeting we have the development of an historical record of previous decisions so that the real allocation often is the increment and there is little or no reworking of the base.

The rise and development of institutional research in recent years has been one of the remarkable phenomena of higher education. Its importance is firmly established and it meets long felt but sometimes unarticulated needs of institutions. The generation of accurate data has always been the life-blood of decision-making, and institutional research is performing admirably in this area. Its great challenge, however, it seems to me, lies not in the refinement of costing principles for higher education, but in developing parameters for evaluating existing programs. This is a challenge that higher education itself has not met and yet is one of its most vital needs.

The traditional methods that we have developed and on which we have waxed strong do not enable us to define, operationally, the educated man or woman, or to measure their contributions to society. This is the challenge, nay the necessity, of the future!

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1. *Administrative Policies and Procedures Manual,* Revised Edition (Athens: The University of Georgia, 1971), p. 105.

2. *Ibid.*, p. 108.

3. "Zero-Base Budgeting Manual," Fiscal Year 1973 Budget Development, State of Georgia, Atlanta, March 15, 1971, pp. 1,2.

4. *Ibid.*, p. 6.

5. "A Planning-Programming-Budgeting System For Higher Education," A Grant Proposal to the Ford Foundation by the University of Georgia, May 1969, p. 1.

THE ALLOCATION AND REALLOCATION OF FINANCIAL RESOURCES TO DEPARTMENTS OF THE UNIVERSITY

Wallace Prescott
Tennessee Tech University

Although the subject of allocation of financial resources to competing units within higher education has long been a matter of genuine interest, a subject of much discussion, and source of a growing concern for university administrators, the current crisis in funding which faces higher education has brought the subject to a state of real urgency. As a result of this urgency there is a growing cry for information and procedures which will facilitate a fair and equitable allocation of scarce resources to competing needs in all types of institutions and systems of institutions in higher education.

The period from 1955 to 1970 has been referred to as the great boom in higher education, and during this period the primary focus of attention of faculties, administrators, and governing boards has been on growth and enrichment. In recent years, however, there is growing evidence that the boom is slowing down, if not already at an end, as state legislators have become increasingly resistant to larger and larger annual increases in appropriations requested by publicly supported colleges and universities. The reaction of the legislatures reflects a growing sensitivity to the public demand for greater justification for budget requests and to the fact that other social needs including mental health, welfare, environmental affairs, and primary and secondary education are becoming increasingly competitive in the battle for public funds.

As a result of these competing demands and a growing skepticism on the part of the public, colleges and universities are experiencing more and more pressure to demonstrate greater accountability and budget justification in all facets of their operations. Meanwhile, the federal government has been backing away from many programs involving higher education, and private donors are re-examining abilities and merits in the area of private gifts. Simultaneously, inflation continues to reduce the effectiveness of resources that are available.[1]

The net result of all of these forces is a real and growing financial stringency in higher education, this stringency manifesting itself in deficits in private institutions and both quantitative and qualitative retrenchments in institutions of all types. The overall implication is that during the next few years college and governing boards, administrators, faculty, and students will devote considerable time to the allocation of limited resources among nearly unlimited needs.[2]

Faced, then, with limited resources, increasing demands for services, and anxious public and private funders, some administrators have turned to management by crisis; however, responsible academic administrators are exhibiting a growing interest in management practices that offer some promise of alleviating an apparently impossible situation.

In spite of a growing awareness on the part of university officials of the need for reforms in college and university budgeting, motives inspiring management innovation have been less a response to inner necessities of university management than they have been a response to the requirements of the external world, most notably the state legislature and state coordinating agencies. Universities are the source of constant intellectual and scientific innovation for society as a whole, and yet university personnel are highly reluctant to accept changes in the operation of the budget itself. The reluctance appears to be greatest at the departmental level where the aloofness on the part of the faculty toward what they consider business functions of their institutions becomes highly evident.

In spite of historically established procedures and tradition, it now appears that in the allocation and management of financial resources, habit and sentiment can no longer take the place of responsible judgement.

Some universities will undoubtedly attack the problem of resource allocation by attempting to refine the more traditional methods, continuing the use of the object budget. Additional cost studies will be conducted within individual institutions and within systems of institutions as well as on regional and national levels.

At the departmental level, faculty workload will receive renewed attention and new standards will be recommended in terms of student-faculty ratio, credit and contact hours, student credit-hours, and faculty service units, since faculty salaries represent the major item in a departmental budget.

The inherent weakness in the cost-study approach is that results are entirely dependent upon prior-year or prior-years conditions, and the pattern of costs established by this method may not be desirable at all. Prior-year budgets may have been totally inadequate or totally unjustifiable.

A sufficient number of cost studies have been conducted to establish patterns of the percentage allocation between major categories of costs. *The Sixty College Study: A Second Look* presents the results of two parallel cost studies conducted four years apart. During that four-year interval between studies, costs for all colleges increased by approximately 35%; yet the percentage allocation between major categories of costs did not vary by as much as one percent from one study to another.[3] Such consistency does not necessarily imply correctness; however, cost studies may serve a valuable purpose in that reasons for wide variations from the general pattern may be explored and justifications found for these differences.

The credit hour is the usual transaction unit in instruction in higher education and it is only natural that in cost studies this unit should be the meaningful measure of instructional output. A major finding of one comprehensive study is that there has been no perceptible decline (or increase) in real costs per credit hour over the period 1930-67.[4] Such results may be interpreted as indicating that there has been no apparent productivity advance in the higher education industry in 37 years, but a built-in weakness of cost studies is that only quantitative measures are considered and qualitative changes tend to be neglected altogether.

The traditional object budget typically reviews one, two, or more years of previous operation, but seldom projects for more than one or two years. Such a budget is a useful record of the outlays of an institution and it provides a technical instrument of fiscal authorization and control, but it indicates virtually nothing about the way in which money is being spent to achieve the major objectives of an institution. Hirsh has suggested that existing budgeting procedures in higher education are so patently uninformative that they effectively conceal most of the insight needed in making resource allocation decisions in higher education.[5] Problems of interpretation are magnified for external agencies.

Because of built-in weaknesses in the traditional budgeting process, there is a growing interest in more satisfactory management practices applicable to higher education. Program budgeting appears to provide one business-proven method for rational decision making consistent with the higher education environment. Basic principles involved appear to be valid, but application will require a measure of adaptation and not simply adoption. A program budget system identifies and organizes the activities of an institution in terms of its objectives, displays the costs of these activities over an extended time frame, and relates these activities and their costs to the outputs associated with the achievement of the institution's objectives.

Implementation of program budgeting must be based on the identification of specific institutional objectives and the establishment of goals that satisfy these objectives. Establishment of objectives and setting of quantitative as well as qualitative goals demand full participation of departmental faculty and a concise definition of the role of the departmental chairman. Precise definitions of input and output must be formulated.

The program budget cycle for university management is now well established in the literature and is readily available in simple outline form;[6] however, full implementation of the process for complex institutions involves modeling and simulation in which there is a mathematical description of the interaction of all the various elements of the university.

In spite of pressures within a university to maintain subjective, personalized, and individualized decision making in budgetary matters, pressures outside the university for rigorously quantified budgetary decisions will undoubtedly force top level university administrators to move toward more sophisticated budgetary procedures.

Traditional budgeting procedures in higher education have focused little attention upon the relationship between cost and performance; in fact, efforts to relate the two factors appears somehow to have been regarded as illegitimate. Higher education must now face realistically the issue of effective use of resources. The use of program budgeting should lead directly to a consideration of cost efficiency. Questions about efficiency lead to significant questions about teaching and learning and to the greater question about the real purpose of colleges and universities. Such questions can be intellectually challenging, and when developed within individual departments can be most rewarding.

While advocates of program budgeting, sophisticated statistical analyses, simulation modeling and other complex aids to resource allocation in higher education promised much from their use, there appears to be little evidence to date that there has been widespread successful application of the new techniques;[7] however, judgement should be reserved until more attempts have been completed.

Perhaps the difficulty in achieving change lies in the level of administration at which decisions have been made relative to changes in management practices. Certainly some resistance, based on valid reservations, can be overcome if the leadership to improve operations comes from within individual departments and schools, rather than from a central management office.

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TOWARD RELIABLE REVENUE FORECASTING

John M. Burnham
Earl D. Thorp
University of Miami at Coral Gables, Florida

The overall style and program structure of any institution of higher learning (IHL) depend directly on the sources, amounts, continuity, restrictions, and dependability of its operating funds. The maintenance of present operating levels for programs and services and – most critically – the changing of these levels, programs, or style are completely dependent on the revenue estimate. Given recent financial exigencies and the resulting "balanced budget syndrome," educators and financial officers have eschewed needed shifts in program emphasis, faculty renewal and strengthening, and even physical facilities maintenance, since they lacked dependable revenue estimates – the vital though woefully understudied factor constraining the managerial revolution in higher education in the 1960's.[1] Any realistic attempt to establish long-range planning and priority-effective resource allocation programs in IHL must be based on more certain knowledge of the financial future.

At a Workshop for the Experienced in Institutional Research, the authors described interdisciplinary experiences with models syntheses for assessing the revenue-generating capabilities of universities and colleges, showing the merger of mathematics and systems analysis, of decision theory and sociological processes. We noted that most cost control systems recently proposed for adoption by universities appear backward.[2] Rather than exhaustively and constantly adjusting cost structures to accommodate vagaries of revenue flow, revenues must be forecast more skillfully and used as an upper bound for costs. Our experience generally suggests more missing than hitting the mark when models are used that place the need for change in process and organization ahead of fashioning controls for crises in funding. Currently, in forecasting revenue segments, we are using one of the more effective tools of the business researcher – econometric analysis.

Our central purpose is to stress the need for reliable revenue forecasting as a prerequisite to any sort of rational resource allocation planning.

A RESOURCE ALLOCATION MODEL

In order to maximize total prediction utility for each of those factors associated with the benefits of learning, with research, and with service, each of the benefits (social profit, satisfaction, revenue, etc.) is given an associated utility weight with some sort of goal ordering.

Our constraint set ascribes a cost or activity vector to each of the decision variables which make up students, research projects, outside community activities, curricula, etc. These decisions reduce the amount of resources available for other uses – in particular, the resources faculty, research faculty, administration and staff, students themselves, facilities (represented by classrooms and dormitories) and lastly, for our model, the budgetary restrictions.

Even assuming that there is both a willingness and the ability to generate the large number of coefficients needed to solve the model (and also, in its defense, that many of the technology values, and many of the right-hand constants, are available), the solution is only as good as the ability to estimate the size of the budgetary restrictions – the various components, general funds or restricted – which make up the spendable revenues within the planning period. We doubt the whole model's usefulness without reliable estimates of the revenue for which the model is to prescribe expense allocations. This is not to say that generation of such a model with reliable estimates of the various coefficients cannot be undertaken. In fact, some of our university-particular research is directed at precisely such a model, with the promise of reliable revenue forecasts to make the solution a useful one.

This model presentation is of primary virtue in emphasizing that a resource allocation model cannot work without these revenue estimates, and that given the estimates, however gloomy, such a model can prescribe the best allocation of the available funds consistent with the IHL goals structure detailed by the objective function. Again, accepting the mathematical model framework as appropriate, the absolute dominance of budget elements in determining the style and program emphasis of an IHL is apparent. A reduction in expected funds will lead to a bottom-up reduction in activities, maintaining minimum allocations to those activities deemed essential – and, *in extremis*, to simple survival, with attrition and deterioration taking its toll on both style and program, to the ultimate detriment of IHL generally.

THE INFLUENCE OF REVENUES

Pragmatically, the sources, amounts, reliability, and restrictions (classifications) of revenue will prescribe the rational style and program structure of the IHL. The deliberate decision to alter the present revenue mix will require investment in new curricula and programs before revenues derived from these changes will be available. Since our ideal IHL will already have an ordered goals structure, the choice of such investment alternatives will be guided by the optimum resource allocation model containing these goals. This statement is supported by considerable historical evidence.[3] Those IHL which could not effectively adjust their programs downward and survive had to close or consolidate. Burnham and Thorp[4] further document the prior research and its contributions, strongly emphasizing the dominant effect which funding mix has on IHL planning and budgetary activities – discretionary commitment; realistic planning horizon; ability to adapt programs and style to dynamics of the environment – and suggest what might be done to improve the situation.

We submit that much of the crisis in funding for IHL and federal and state agencies has been the direct result of ill-conceived dependence on highly aggregated, comprehensive revenue projections concomitant with the unexpected necessity for crisis-oriented financial retrenchment, and the advent of the "balanced budget syndrome" which effectively denies any significant discretionary investment capability without reallocation away from present programs or the taking of a more austere stance.

We have tried to provide the executive educator/administrator/financial manager with better estimates of his income in advance so that effective allocation decisions can be made. The programming and budgeting aspects of PPBS can be inter-related with some confidence, leading to decision making under risk rather than under certainty.

REVENUE FORECASTING

Our approach has been that of a models synthesis of a sort not previously reported in a university context. We have developed plausible first models for one university (U of Miami) by identifying actors which affect the decision processes of the clients or sponsors of the IHL:

a. the major categories contributing to total revenues and, in particular, to the unrestricted or general funds
b. the dissimilar elements which make up a category of receipts
c. appropriate statistical and economic approaches to locate and quantify independent variables that influence revenue behavior, such as: (1) impersonal macro-factors (world, national, regional) and (2) particularized micro-factors (class, program, regional, environmental, social, cost-benefit, etc.).

For the University of Miami, the following revenue breakdown emphasizes the need to understand thoroughly both the macro- and micro- determinants of student decisions to inquire, apply, enroll, and remain at an IHL:

tuition and related student fees	–	87% of general funds
indirect cost recovery of sponsored research	–	10% of general funds
endowment fund earnings	–	1.5% of general funds

Research grants funded will explain overhead recovery. The growth and capital appreciation of the endowment fund will explain its earnings. Almost all of our work to date has been aimed at enrollment prediction, to explain tuition fluctuation. It should be emphasized that these findings from the University of Miami are not *directly* applicable to the many public institutions where tuition represents a much smaller portion of general funds income and where revenues from non-federal government authorities are the bulk of unrestricted income.

ENROLLMENT FORECASTS

An earlier paper[5] describes the steps by which we were able to provide, (using a limited sample), plausible enrollment estimates. There were a number of distinctly different potential consumers of the university product.

1. new freshman enrollments, no previous post-secondary experience
2. new transfer students from other IHL
3. readmits with over one year's absence from the University of Miami
4. continuing students, enrolled in the preceding spring term and not expected to be graduated in spring or summer terms
5. non-degree candidates (among any of the above classifications)
6. part-time students, generally local or temporary, but working
7. graduate student body, as distinguished from the undergraduate groups described above, including:
   o Master's, full time
   o Doctorate, full time
   o Part-time, either designation
   o Professional schools of medicine, law, nursing.

Initial disaggregations treated four separate groups of full-time, degree-seeking undergraduates who are (1) new freshmen, (2) transfer students, or (3) continuing students, and (4) all graduate students not in one of the professional schools, but including both full and part-time. This breakdown accounted for over 13,000 of the 18,000 total enrollment at this university.

In the approach to appropriate ratios and independent variables, economic and demographic analysis guided our search for significant relationships. Over several months of testing, we were able to identify and establish significance for a group of:

1. *uncontrollable macrofactors:*
   a. wealth, economic activity, the stock market
   b. duration and rate of local and national unemployment figures
   c. draft-call level, size of standing army
   d. size of high school senior class, socio-economic status mix
   e. average cost per year, ratio of private to public IHL
   f. federal and state aid to higher education, especially loan and tuition assistance programs
2. *uncontrollable microfactors:*
   a. size of institution, faculty size and mix, colleges
   b. local and regional environmental attractiveness
   c. local and regional competition for students
   d. national competition of similar IHL for students
   e. class; program, and regional attributes of IHL
3. *somewhat controllable microfactors:*
   a. tuition and related fees
   b. subsidy programs, fellowships, scholarships
   c. admission standards
   d. marketing – attraction , recruitment, retention efforts, direction and intensity
   e. innovation, dynamic image, actions changing class, program, style

It is probably possible to quantify and interrelate each and all of these factors, but not with only our 10 years of data and one IHL to work with. Our results, therefore, while useful and suggestive, are by no means complete and broadly validated for application to all IHL. We can report that our treatment of the data for the years 1961-1968, using only the impersonal macro-factors and the tuition index concept, produced a nearly perfect explanation of the university's enrollment experience for 1968, but an underestimate for 1969. All of the economic factors which seemingly had so well explained the 1961-68 enrollments had turned down by fall 1969, but the fall enrollment exceeded that of 1968 by a comfortable margin. This was not so for spring 1970, however, when the first indications of the impact of the economic downturn were being registered at this and other IHL. By the next forecast year, 1970, the years of financial crisis were upon us and the simple trend extrapolation was completely unsatisfactory. The model predicted in advance the spring 1970 experience and that for fall 1970-spring 1971. Since the fall 1969 actual enrollment was still on the aggregated trend line, expansion continued apace. The university experienced a $0.5 million deficit in 1969-70, and a $1.8 million deficit in 1970-71, since the long lead time for adjusting the faculty mix and other somewhat variable commitments would not permit intra-year adjustment.

Our results provide model listings and the error experience for both the first (1961-68) and second (1961-70) sets of data used for forecasting purposes. Addition of the more recent years increased the forecast error considerably. The aggregate maximum likelihood forecast for 1971, however, was quite close to later data gathered by the registrar.

PERSONAL CHOICE MODELS

We have not had sufficient time and information to explore some of the evident implications, omissions, and simplifications made to permit the work reported in this presentation. This is especially true in the personal choice and critical life choice situations. We are certain that omitting these elements is costly in terms of model completeness and accuracy. While the studies to answer these questions are now going on, results are some months in the future.

Some preliminary qualitative conclusions, based on a limited number of in-depth personal interviews with local high school seniors and on some confirming questionnaire data gathered at the university from presently enrolled students, can be offered.

Each student-to-be has criteria by which he evaluates possible IHL. Depending on socio-economic status, class rank, and the richness of his formal and informal advising sources, he will assemble detailed data about certain IHL. As this data is evaluated, the student generates information about main dimensions of rational concern – and locates the candidate IHL along these dimensions. Based on the data we have thus far, the student usually has a single dominant concern which must be satisfied, or the IHL is rejected. Other, less important, elements will then be the basis for ranking IHL rationally. The factor at the uppermost rank, we find, is reputation – of the school, and of its academic program. This is closely followed by physical and environmental factors, such as campus, library, dormitories, community, geographic location. At a third level, certain administrative or cost elements are significant. The rational model says that a student will select the highest quality academic IHL he can, with some offsetting weights furnished by locale, social activities, or costs.

However, we have also tentatively concluded that selection of a college is much like voting or getting married – a critical life choice in which some set of ill defined but vital feelings, and their validation or verification by some other (probably peer group) influential, will be the trigger for selection – but not necessarily of the top ranked IHL according to the rational model.

FUTURE REVENUE MODELING

The treatment of the enrollment models is far from complete. Even further behind is a similar analysis on research revenue prediction – a problem recently brought forcefully to the attention of the public by the Carnegie Commission.[6]

Looking even further ahead, endowment funds (both as a source of potential investment capital to help change style and program emphasis, and for current income) must come under similar analysis. This inquiry began only two years ago, with noteworthy qualitative methods by Paul Woodring for the Ford Foundation.[7] Gains, earnings, and gifts to the endowment fund of an IHL, just as in the enrollment situation, will respond directly to IHL reputation and alumni interest, wealth, the stock market, and general economic health.

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JOINT WORKSHOP OF AIR AND NCHEMS

William L. Tetlow
The University of British Columbia

The purpose of the workshop was to discuss requirements for new and sophisticated tools to assess accountability and evaluation in higher education today, in contrast to requirements before the turn of the century and immediately thereafter. The focus of the workshop was the conceptualizations and techniques which NCHEMS is now making available.

Only in recent times was there a need for sophisticated analyses. Colleges of the 17th and 18th centuries were small, had clear, unchallenged purposes, and their entire operations could be easily comprehended. The period from 1636 to 1906 was characterized by individuals, such as Stiles, Ticknor, Morrill, Barnard, Eliot, Butler and Harper. The early 1900's, however, began the "era of the survey." President Henry C. King of Oberlin College was the author of the landmark survey in 1908. Then came Abraham Flexner's 1910 report on medical education. During the 1920's and 1930's, some institutions began forming bureaus of educational research, principally involved with student admissions, performance, and expectations.

The prime forces promotion institutional research were the so-called "G.I. Bill of Rights" in 1944 and the Truman Commission in 1946. Research or studies were needed to deal with massive increases in enrollments, concomitant rises in staff, skyrocketing costs, increase in number of institutions, and more egalitarian and diverse student bodies.

The present size and revenue requirements now make institutions vulnerable targets for critical examination. Education is a billion-dollar industry that operates largely without detailed cost analysis, management systems, and effective evaluations, all of which require sophisticated analytical tools now used by executives in business and industry. All of this led to formation of the National Center for Higher Education Management Systems (NCHEMS) in 1968. The joint AIR and NCHEMS Workshop explored NCHEMS analytic techniques, procedures, and tools, to aid institutional researchers in providing management information to the decision makers. The first three critiques were of NCHEMS projects dealing with improvement of the communication base.

A. A. Sterns presented several papers (available from him) that described an alternative classification system, being developed under a Ford Foundation grant, to NCHEMS' Program Classification Structure (PCS).

Donald DeLong analyzed the Faculty Activity Analysis (FAA) Project, designed to develop standard procedures for analyzing faculty activities and techniques for collection of data, to serve as a basis for allocating faculty resources to programs.

D. L. Trautman commented on the Information Exchange Procedures Project (IEP) between and among institutions.

The Cost Finding Principles (CFP) Project, designed to determine total costs of operating each of institution's programs and to provide conventions for allocating costs, was reviewed by D. R. Witmer; J. R. Topping, the CFP project manager at NCHEMS, responded.

One of the more fully developed NCHEMS' tool is the Resource Requirements Prediction Model (RRPM) which was critiqued by B. S. Sheehan. RRPM is a computer model, intended to assist in simulating mathematically the resource requirements of an institution in terms of personnel, physical space, and dollars.

A. J. Barwick critiqued the Student Flow Model (SFM) project – directed toward developing an analytical mathematical model to aid in predicting student enrollment and student progression through post-secondary education.

AN ALTERNATIVE TO THE NCHEMS PROGRAM CLASSIFICATION STRUCTURE

A. A. Sterns
The University of Georgia

The University of Georgia has developed a Program Classification Structure (PCS) which is independent of NCHEMS.

Certain questions have been raised: Are the areas dealing with instruction, research, or service, considered as functions or are they programs of all three?

There are four functions of a university: it is a conserver of culture, a generator of knowledge, an instructor, and a servant of the public. Directing functions through programming is done by administrators who determine outputs and allocate resources.

The University of Georgia has eleven major objectives which are grouped into three major programs. They can be converted to NCHEMS definitions. Those seeking a detailed description of Georgia's program classification structure may obtain a copy by communicating with Dr. A. A. Sterns. Several other documents might also be of interest: *Data Element Dictionary – Service Related Elements Section; and The Costing Principles in Higher Education and their Application.*

CRITIQUE OF THE NCHEMS STUDENT FLOW MODEL (SFM) PROJECT

Allen J. Barwick
North Carolina Board of Higher Education

In practice, most student flow models concentrate on quantitative aspects primarily due to the requirements of budgetary planning and considerations. The NCHEMS Project is no exception; that is, their prototype model, SFM-IA, has as its primary objective, the projection of student enrollments. In contrast, other more general models are being considered by NCHEMS. Since the model now being tested by NCHEMS is just one portion of the total student flow modeling effort, it would be unfair to evaluate just the SFM-IA in its current state.

The single most important planning problem at the institutional level is that of resource allocation. Consequently, *enrollment projections* for resource planning purposes was selected as being the most important need of planners. As a result, the primary initial goal of the NCHFMS Student Flow Project was to develop a model to: (1) predict student enrollments, and (2) simulate student progression through the post-secondary education system. Implicit in this goal is the intention of focusing on both institutional and inter-institutional problems of student flow.

In the most general sense, student flow is best characterized by what is known as a "state-transition" process. The state of the process is the "position" occupied by the student at a given time, and the transition, of course, characterizes the time to make a move and to where he moves. The sequence of states occupied by the student, (i.e., the process trajectory), as well as the time to make this trajectory, may be completely random. Nevertheless, the statistical behavior of this process could be specified if the conditional probability of being in each state after some arbitrary time interval, given we know the entire prior trajectory, can be defined. Indeed, specification of the probabilities would itself be a problem. The specification of such probabilities is generally handled through simulation, e.g., Monte Carlo simulation. NCHEMS, however, chose to go another route.

Rather than simulate all possible transition probabilities, a more expeditious solution to the problem is to evoke the Markovian assumption. The Markovian assumption greatly simplifies both the possible behavior of the process and the problem of specifying the process. The assumption is that only the last state occupied by the process is relevant in determining its future behavior. In other words, the future trajectory of the process depends only on its present state. Another simplifying assumption is that the time to make a transition is a deterministic variable; i.e., a degenerate random variable of one time unit (one term) is required per transition. The simplified process is commonly known as a Markov process.

The general design of SFM-IA is in most respects Markovian in nature. In a sense, it is to be more general than the classical Markov design in that the Markovian assumption is somewhat relaxed. In a strict sense, the Markovian assumption implicitly incorporates the idea of stationarity; i.e., the transition probabilities are stationary from one period to the next. The SFM-IA allows the possibility of making changes in the transition probabilities. The problem, of course, is determining what these probabilities are.

Two additional significant assumptions implicit in this model are: (1) movement of students are made simultaneously and at discrete points of time, and (2) the classification of students among the states of the model are mutually exclusive. Such assumptions will tend to invalidate the model if it is used in non-traditional structures such as the external degree, independent study, cross registrations, etc. By extending the model to a semi-Markov process (this process is similar to the Markov process – the major difference being that the time for a transition is itself a random variable), both assumptions could be somewhat relaxed.

In summary, SFM-IA provides a skeleton framework for the accounting of students as they progress through the system, and it aids in determining the most fundamental part of the process – the transition probabilities. It does not address the problem of the stability of the transition probabilities. It does, however, allow the user complete freedom in specifying such probabilities. Thus, the burden of establishing stationarity is on the user – which is as it should be.

Finally, two strong points of the Student Flow Model include: (1) the Markovian nature of the model provides a firm well-founded basis for sound theoretical and analytical extension, and (2) as contrasted to other student flow techniques, the comparative validity of Markovian models is as good or better.[1] Unfortunately, however, NCHEMS efforts to date, have not fully exploited the theoretical potential of the Markov process. Once the existing model has been perfected, research efforts should be directed toward a general theory of student flow. NCHEMS does have plans to pursue this idea by developing a textbook-like document on student flow.

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[1] Orwig, Jones and Lenning, "Projecting Freshman Enrollment in Specific Academic Departments," *Institutional Research and Institutional Policy Formulation*, Proceedings of the AIR, 1971, pp. 123-127; Zimmer, "Projecting Enrollment in a State College System, 1971," *Institutional Research and Institutional Policy Formulation*, Proceedings of the AIR, 1971, pp. 134-139; and O'Grady & Feddersen, *A Student Flow Model For California State Colleges, Fullerton; A Feasibility Study*, Division of Analytical Studies, The California State Colleges, January, 1972.

CRITIQUE OF NCHEMS FACULTY ACTIVITIES ANALYSIS (FAA) PROJECT

Donald C. Lelong
University of Michigan

The FAA has been directed to two general goals: a) outlining procedures for compiling faculty-activities data useful to a variety of institutions for their own analytical purposes; b) a methodology for furnishing data for potential use by the NCHEMS Cost Finding Principals project.

FAA has suffered, however, from the need to build a data base without knowing exactly how that data base is to be used by the Cost Finding Principal Project.

NCHEMS Task Force attempted to cover data needs for three general types of analysis: (a) budgeted or assigned faculty activities; (b) an ex-post accounting of faculty activities as these activities actually took place; (c) anticipating the need to examine relationships among various types of faculty activities such as research versus public service, and the need to relate faculty activities to educational outcomes.

The tentative data collection instrument is essentially an activities-outcomes matrix. Along the vertical axis are typical faculty activities in more or less conventional categories. Across the top of the form, several types of outcomes are identified to which faculty activities contribute – primarily instruction, research, and public service. The faculty member is expected to estimate the average weekly hours he spends in each type activity and record them on the form.

Faculty members will have to be carefully oriented, because the relationships between activities and educational outcomes will not be obvious to many of them. Instructions for filling out the form are fairly long and complex, and it will be important that faculty understand the definitions used. The instrument will not be appropriate for collection of routine data concerning teaching loads and student credit hours (at least in the long form), and some other vehicle could best be used if that is the only information desired.

Final forms will probably not instruct the implementing institution in detail on this subject of sampling resource data.

Faculty-activities data are never likely to be very precise. If results are used to beat individual faculty members or department chairman over the heads, the potentially unbiased data source will be destroyed. Finally, the relative values revealed through comparisons among activities or between activities and outcomes promise to be of much greater use than the absolute values.

CRITIQUE OF NCHEMS INFORMATION EXCHANGE PROCEDURES (IEP) PROJECT

De Forest L. Trautman
State University of New York at Stony Brook

The Information Exchange Procedures (IEP) Project must be viewed in the context of avid interest in instructional cost and related data among colleges, university systems, coordinating councils and supporting agencies. Considerations are:

1. The instruction system: What should the data describe?
2. Experiences with data reporting: What is now being done?
3. Comparative analysis and decision-making: What insights and procedures may be employed from these analytic fields?

Other concerns are:

1. Structure of the IEP Project
2. Objectives, schedule and initial activities
3. Suggestions to increase effectiveness

The suggestions which were offered concentrated on sharpening focus, making the best use of available experiences, and going directly to determining what are the data and how best to extract appropriate messages from them.

CRITIQUE OF NCHEMS RESOURCE REQUIREMENTS PREDICTION MODEL (RRPM) PROJECT

Bernard S. Sheehan
The University of Calgary

The RRPM model simulates instruction and related activities in a particular institution and projects costs for successive time periods. It is a deterministic average cost accounting model which does not seek to optimize university operation nor does it relate to revenues or evaluate outputs. RRPM input includes enrollment forecasts, student preferences, staffing patterns, load factors, salary and cost schedules, changes in planning assumptions and instructional programs. Outputs are the resources (personnel, space and dollars) the institution requires to operate under the simulated conditions.

Institutional dynamics simulated by RRPM are assumed to be linear. Parameters not inputed are estimated by regression analysis. The modular structure provides the design modification flexibility needed to adapt the model to each institution and to future changes in the model and the institution. RRPM uses the Higher Education General Information Survey discipline categories and the program structure defined by the WICHE Program Classification Structure. Throughout, definitions conform to those in the WICHE Data Element Dictionary. The model is autonomous and does not permit user intervention. To the extent that models can be classified in this way, RRPM has research rather than operational status.

Central to RRPM (both conceptually and operationally), is the induced course-load matrix. The ICLM is a four-dimensional student credit hour matrix used in two critical operations of the model. The matrix transforms student enrollments by major and level into work loads on academic departments. These work loads form the basis for all instructional resource and cost computations. Also, the ICLM is the vehicle by which departmental costs are allocated to student major programs. In order to generate the ICLM, the following data on each student for each period simulated is required: level of each course taken, discipline of each course taken, the number of units of credit for each course, and the major and level of each student.

RRPM seems best suited as a staff, fiscal and physical planning tool with less application to curriculum planning or scheduling problems. The model is student driven, but there is no associated student flow module.

Implementation requires answers to these suggestions.

1. What are the minimum computer hardware requirements? Are there any special software requirements?
2. What data must be generated to support the model? What are the minimum specifications of these data?
3. What other resource requirements in terms of dollars, people and specific talent must be met?
4. What specific, practical improvements in which aspects of short and long-range planning can be expected?
5. What secondary or spin-off benefits should be anticipated?
6. How does the present institutional commitment to and experience with analytical management tools affect these expectations?
7. What units of the institution should be involved? How?
8. To what extent should members of the faculty be involved?

RRPM will not meet all the needs of any particular institution. Implementation will be time consuming and expensive. The program classification structure and data element definitions will not exactly match each institution's structure or administrative practice. Existing data banks will need extensive modification to adequately support the model. The validation of the model in a particular environment will be difficult – perhaps impossible – without major changes to both.

The question is: Have the compromises necessary to design a model for most institutions offset the disadvantages of the alternatives of building a custom model(s) for your institution or of not acquiring a model at all? A further question Since RRPM is designed for use in many institutions, have the advantages of its modular design been carried far enough? Since "implementation" means using the RRPM building blocks to fashion an unique simulation of an unique institution, should not RRPM be more like a high-level programming language?

RRPM cost coefficients can be determined by regression analysis using historical data. This assumes that past functional and organizational relationships are valid for the projected period of operation. This seems unlikely and probably some form of adaptive control should be placed on the value of important parameters projected into the future.

Needed RRPM additions relate to benefits/output evaluation, student and faculty flow modules, procedures for allocation of support costs to primary programs, features to make the model more user-oriented, and appropriate treatment of the other primary programs of organized research and public service. There are other changes which will probably also be suggested. These include provision to allow the class size and number of sections to be dynamically variable during simulation, optional features to allow additional relationships between variables to be programmed, and options with respect to the lowest level of aggregation of a variable used in the model.

CRITIQUE OF NCHEMS COST FINDING PRINCIPLES AND PROCEDURES (CFP) PROJECT

David R. Witmer
University of Wisconsin
Responding: James R. Topping
NCHEMS

The National Center for Higher Education Management Systems (NCHEMS) concentrates on:

1) The development of a *common communication base* for the exchange and reporting of program and cost data.
2) The development of *analytical tools and systems to* derive, from accumulated data, information for the improvement of program-planning, resource-allocating, and outcome-evaluating decisions in higher education.

The Cost Finding Principles and Procedures project touches both. It is intended to lay the definitional foundations for comparable exchange and reporting of cost data and to develop the methodologies for cost analysis and information creation concerning the various activities in institutions of higher education. Specifically, the Cost Finding Principles and Procedures project aims at standardizing the conventions for identifying, distributing, and allocating costs to specified academic programs within an institution. The cost allocating procedures are to be described in such a way that the total operating cost of each program will be computed.

The products of the project can be improved by:

1. Editing the final report so that the terminology is internally consistent, and consistent with other NCHEMS documents and established academic conventions and not inconsistent with A-21 or its successors. The following terms are sometimes used as synonyms: cost centers, activities, projects, programs, departments, units, and disciplines.

Topping: The word program is defined as "a collection of resources, technologies, and policies that, through their integrated operation, produce goods or services that contribute to the achievement of an institutional objective."

2. Definition and uses of cost data, should include brief discussions of these terms: social costs, student earnings foregone, transfer payments, objects of expenditure, imputed costs in lieu of taxes, sunk costs, differential costs, private costs, operating costs, supplementary services, cost accounting, and total costs.
3. Costs need to be described from the perspective of the students (resident, nonresident, full-time, part-time, undergraduate, graduate, chemistry majors, pre-law, etc.), and the respective governments as agents of society (trustees, legislature, etc.).

Topping: We are attempting to cost institutional programs as they are defined by the Program Classification Structure. We are not attempting to identify the full educational cost to the student nor are we attempting to identify the costs of the various governing bodies. The emphasis is on full cost of resources.

4. Explanations are needed to define exclusions and additions to the institutional budgets and accounts; the importance of establishing certifiable, auditable, control totals over costs included; the difference between budgeted and actual expenditures; and how to prorate the costs of different parts (semesters, quarters, summer sessions, etc.) of the school year.
5. Explicit procedures should be included comparing the costs of different instructional processes and techniques (e.g., lectures vs. autotorial labs) and for highlighting the cost and other differences between the services the administration planned to purchase, as revealed by the budget, and the services provided by the faculty, as revealed through Faculty Activity Analysis.

Topping: This is beyond the scope of the Cost Finding Principles Project as presently defined. Within the Instruction program, we are costing at the course level by discipline.

6. Include distribution of the costs of non-FAA staff, supplies and expenses on the basis of f.t.e. faculty as Alternate VI.

Topping: It has now been incorporated into our working draft.

7. Describe how to distribute the costs of physical facilities according to room type and function.

Topping: One of the alternative procedures for the valuation of capital assets will employ the Markel construction cost index which provides different weights for different types of space and construction.

8. Develop two distinct procedures for allocating support costs: (a) to compute the total costs of support functions, allocate the costs of each support function to each cost center it supports, then for each cost center add the indirect costs of these support services to the direct costs; (b) to compute the total costs of instruction, research, and public service, apply the Progressive Primary Use Plan described by John Evans of Indiana 15 years ago.

Topping: Three allocation methods commonly used in higher educational cost studies are:

a. The direct allocation technique similar to the first method that Mr. Witmer described.
b. The recursive or step-down technique similar to John Evans' Progressive Primary Use Plan.
c. The cross-allocation or simultaneous technique which makes the assumption that one cost center can support any other cost center and relies upon simultaneous equations for solution. This latter method

will not be tested because of the mathematical complexities involved when dealing with several hundred cost centers.

9. Explain why the costs of administering the student financial aids operations and auxiliary enterprises are considered indirect costs of instruction.

Topping: The costs of many of the student service programs will be stated as unit costs in terms of the number of students actually served or those students in the target group.

10. Describe alternate methods of costing credits, sections, courses, and projects, and alternate methods of determining costs per f.t.e. student by level, by program of study, by residence, etc.

Topping: This approach lies beyond the scope of the Cost Finding Principles Project.

11. Add procedures for making, and keeping track of adjustments in costs, units, and methodologies so that the modeling of alternatives can be readily undertaken. Give the user the capacity of computing the effects of incremental and marginal change. Provide techniques for costing in terms of revenue sources.

Topping: It is the underlying intent of the Cost Finding Procedures Manual to provide alternatives for the user and to fully document these alternatives.

12. Three different methods of aggregating the unit costs of student-degree programs of study should be described:
    (a) the method analogous to the registrars' procedures for recording academic credits. Under this method the costs per credit are recorded on each student record in the same way that grades and grade points are recorded at the completion of each term.
    (b) the method based on student program-course of instruction matrices.
    (c) the method based on faculty-required and recommended programs of study as presented in college catalogs.

Topping: Again, this is outside the scope of the Cost Finding Principles Project and falls within the domain of Information Exchange Procedures. In Cost Finding Principles, we are concerned with disaggregating total costs to a specified program level of the Program Classification Structure, not with recombing these costs into various formats.

THE REPORT OF THE COMMISSION ON POST-SECONDARY EDUCATION IN ONTARIO

Douglas Wright
Provincial Secretariat for Social Development, Ontario

It is a pleasure to discuss needs and opportunities for institutional research within the framework of the rapidly evolving nature of post-secondary education, with particular reference to our experiences in Ontario. It will be appropriate to commence with some brief background regarding patterns of higher education in Canada. First, let me note that Canada, like the U.S., Germany and Australia, is a federal nation. In all four, constitutional divisions of power left education as a state or provincial responsibility. But in all four, national concerns about manpower and economics, coupled with the greater buoyancy in federal tax revenues, have drawn and pushed federal governments into varying degrees of invasion of states rights in educational affairs.

In Germany, of course, there was a constitutional amendment a couple of years ago leading to the establishment of a federal Ministry of Education with substantial powers. In the U.S. and Australia – over the years – federal programs, often categorical in nature, have tended to greater influence. Canada's position is probably "purest" in that we have no federal office of education and effectively no categorical funding. We do have major transfers of federal money to the provinces. Some of this is simple unconditional sharing of tax revenues, but some is related to expenditures for individual programs, such as higher education and health services. These tend to be called shared-cost programs, though this is somewhat of a misnomer. The Government of Ontario has taken the position formally that it would wish to disengage from all such programs in favour of bargaining for unconditional block transfers from a revised formula for sharing tax revenues.

It follows that in discussing education, and higher education particularly, in Canada, I would have to talk about ten different systems. They are different because of the distinctive historical, cultural and linguistic patterns in the various parts of Canada. In Quebec, until recently, education was the responsibility of the Church and the universities were very closely related to the Church. In Eastern Canada, Scottish traditions had great influence and we have universities established by and still related to a number of denominational groups. In Western Canada we have, for the most part, provincial universities not dissimilar to the American state universities of the west. In Ontario we have somewhat of a hybrid system with fourteen universities, somewhat over half of which (the older half, of course) owing their foundation to the initiatives of denominational groups, with the newer half having been established through government and lay initiatives.

For all this diversity, post-secondary education in Canada shows some quite remarkable consistencies. While, in legal terms, our institutions in Canada approximate most closely to private institutions in the U.S., they are virtually all state assisted (with grants currently representing 80% to 85% of current revenue for operating expenses). Institutions in Canada do not have the private/public division which is such a feature of higher education in the U.S. Next it has to be said that standards in education in Canada are remarkably consistent, undoubtedly much more so than in the U.S. Not only are faculty salaries and per student costs remarkably uniform across the entire country (and both undoubtedly higher than average levels in the U.S.), but academic standards seem similarly to be much more uniform than in the U.S. There is obviously both strength and weakness in this homogeneity.

Until well into the 1950's higher education in Canada meant university education, and the proportion of the usual 18 to 24 age group in attendance was much lower than in the U.S. Even as recently as in 1961 total attendance in Ontario in universities, and all other post-secondary education including teachers' colleges, nursing schools, and the like, was only 8% of the 18 to 24 age group. By 1971 the proportion of 18 to 24 age group in attendance as full-time students in post-secondary education had increased to almost 22% of the 18 to 24 age group. And of course such averaging tends to obscure the fact that many students are now enrolled in new colleges with two or three year courses, much shorter than the six year span embraced in the 18 to 24 definition. The total full-time first year enrollment in all institutions of post-secondary education in Ontario is now over 60% of the one-year age slice of 19-year-olds.

This has been a remarkable achievement, particularly when it is noted that Canada's baby bulge of the early Fifties was relatively larger even than that of the U.S. because of the substantial post-war immigration of young adults from Western Europe.

When I go on to note that average operating costs per full-time student increased from about $550 in 1951-52 to $1,400 in 1961-62 and to over $3,000 in 1971-72, while the percentage of the cost represented by tuition fees was, for the same three years, reducing from 51% to 45% to 12%, you will see that we have had a veritable explosion in cost.

The total operating cost of post-secondary education in Ontario in 1951-52 was $18 million. By 1961-62 it was $82 million. By 1971-72 it was $771 million. I have already indicated how the division of this cost between tuition fees and grants has changed.

In the Sixties, non-university institutions of post-secondary education were established in most parts of Canada. They take different forms. In Quebec CEGEPS (Colleges d'Enseignement General et Professionnel) have been interposed between secondary school and shortened university courses. In Ontario a kind of binary system has come into existence with the establishment of some 20 Colleges of Applied Arts and Technology.

Not unnaturally, the phenomenal growth of higher education has led to concern about costs and functions and, not surprisingly, has also led to the creation of a substantial vested interest on the part of faculty, students, and administrators in the continuation of the growth trends outlined.

By the mid-Sixties the Government of Ontario had established apparatus for dealing with the financing and development of higher education. A government Department of University Affairs was established in 1964. An Advisory Committee on University Affairs was established to give counsel on policy, on the total sums required, and on their division amongst competing institutions. For the Colleges of Applied Arts and Technology a parallel body was established. During the halcyon years of the late Sixties these structures worked quite well.

A number of important developments arose from these structures, including the Ontario systems of formula grants for both operating and capital support. These formula notions, developed and used first in Ontario, have been copied now in several other jurisdictions. They stand in distinct contrast to traditional patterns of line-budget review and/or so-called deficit financing or even budget formulas, in all of which there is an inevitable tendency to control expenditure elements. This is, of course, absolutely stifling to local initiative and efficiency, and, experience suggests, never leads to effective control of total costs anyhow. The formula grant system not only preserves a large part of university independence, but gives the government simple pre-emptive control of unit costs.

By 1969 it was clear that some sort of review of our system of post-secondary education was becoming necessary, not only because of the fantastic growth in cost (which was running at 20% or 25% per annum, compounded) but because of increasing uncertainty about objectives and functions and the patterns and kinds of services provided. Accordingly, the government established a Commission on Post-Secondary Education which got down to work towards the end of 1969. It was composed mostly of people drawn from the present system, including representatives from the government advisory councils, and people from the universities and colleges of the province, including some distinguished institutional presidents, faculty people and so on.

Quite early on in its work the Commission perceived that it was necessary to try to identify and test the fundamental assumptions on which the whole system was based. An initial program of research was undertaken, aimed at identifying "who went where, why, to do what, and who paid and who benefitted?" Concurrently extensive discussions were held with various groups and individual leaders. Before embarking on an extensive round of public hearings in late 1970 and early 1971, the Commission published a tabloid newsprint *Statement of Issues* which tried to focus attention on three categories of questions about post-secondary education; (i) characteristics and objectives, (ii) economics and finance, and (iii) organization and administration. With this discussion and analysis were included a series of provocative questions:

1. Why do we keep piling one year of schooling after another? Why is it necessary to have up to 20 years of continuous schooling? Why not break it up and if necessary space the years over a lifetime?
2. Why is it necessary to assume that learning takes place only when it is institutionalized?
3. Why should professional associations be allowed to stipulate formal educational requirements instead of administering tests? Why do we use degrees and diplomas for occupational certification? Why should one certification last a lifetime?
4. Is there any justification for the conventional academic year?
5. What are the true implications of universality for post-secondary education? Why should society invest in one person and not another?
6. Should we perhaps be asking the same questions about "more" education as there are beginning to be asked about "greater" economic growth?

In the dozens of public hearings that followed, some 350 written briefs were received and many hundreds more individuals spoke. The number of briefs underestimates the scope of the formal input, inasmuch as many organizations (such as the Committee of Presidents of the Universities, the Chambers of Commerce, and the Canadian Banks) each submitted single briefs on behalf of their whole group.

These public hearings told us that the people of Ontario were not so much concerned with the costs of education as with the effective dispersion of services for learning. Almost half of all the briefs received argued for a fuller integration of opportunities for learning with the working life of adult members of the community of all ages. We got a clear message that people were fed up with what appeared to them to be arbitrary and often insignificant rigidities in both our educational system and in the ways in which educational system and in the ways in which educational paper was utilized by employers. Most importantly we came to know that the people of Ontario had a great thirst for learning.

While we were engaged in the hearings a second batch of research contracts was let. They were aimed at answering questions that had come to concern us particularly: about the efficacy of guidance systems, about trends in certification, about the special needs of our francophone population, about the utility of manpower planning as a basis for educational planning, and so forth. And, last June, we started drafting the report.

Our terms of reference obliged us to publish our main report first as a draft so that we might hear and respond to public comment on it before addressing a final version to government. The writing took some five months, and printing and translation (the report was published simultaneously in English and French versions) some weeks, so that the draft came out early this year.

Many will have seen and read the report itself. I shall not try to summarize the whole thing or its 1972 recommendations here. But let me outline some of the main ideas. In a statement of aims and objectives we first argued the humanizing nature of education as leading inevitably to the condition that education must serve individuals not institutions, that individuals should make the decisions that affect them, and that educational services should be available to all citizens throughout their lives, not just to a particular age group. We identified six principles: universal accessibility, openness, diversity, flexibility, transferability, and public accountability.

The main text and recommendations are contained in five chapters dealing with: alternatives, accessibility, manpower and education, structures of authority, and financing.

Under alternatives we argued that universities and colleges should not be used as academic playpens, that government and business should work consciously to provide opportunities for people to combine work and education throughout their lives, and we made a number of specific proposals about how paid leave might, for instance, be arranged fairly painlessly.

In the chapter on accessibility we argued for a much more pluralistic system for the provision of educational services, providing greater accessibility in terms of geography, types of institutions and programs, and so forth, including the creation of a counterpart to the British Open University. Perhaps more importantly we attacked inflation in education, recommending the legal prohibition of the increasingly widespread practice of using educational paper as a proxy, and a monopolistic one at that, for qualification for employment.

In the chapter on manpower we argued against efforts to develop deterministic long-term manpower planning, in favour of much better short-term information. And we proposed an arms-length relationship between guidance and educational institutions.

In our recommendations on structure we argued for the continuation of local boards of governors of individual institutions (avoiding the massive centralization that has occurred in New York and California), and we argued for the continuation of lump-sum institutional grants. But we recommended a coordinating board to operate at the provincial level with authority over the introduction and discontinuation of programs, general admissions policy and the allocation of operating and capital grants as between institutions.

In the concluding chapter on finance we argued for a separation of operating support, as between research and instruction, and the pegging of tuition fees at 50% of the costs of instruction (which would lead to substantial increases in tuition fees) in association with a major loan system in which repayment would be contingent upon future income. As well we proposed free tuition and an unconditional subsistence allowance for three years study for students from the lowest quartile of family incomes.

Our concern frankly was to inhibit and discourage frivolous consumption of educational services while at the same time trying to facilitate greater accessibility on the part of those seriously interested in learning.

The response to the draft report has been most interesting. Almost everyone likes the fairly radical recommendations on alternatives and accessibility. A few faculty people see recommendations aimed at curbing tendencies toward a regressive and elite system as an attack on quality.

The response to the recommendations on finance are also interesting. Some of the more political student leaders have called them progressive and indicated their support. Not surprisingly, numbers of other students have objected – getting the argument about accessibility all backwards. Of course, our own economic analyses confirmed the findings in Sweden and in California which showed that a low tuition system for post-secondary education is highly regressive.

Somewhat to our surprise, there has been fierce response from university faculty members and administrators to our proposals for a coordinating board. (Interestingly, the students do not object much to these proposals.) What is surprising about this to us is that most of the powers proposed for the coordinating board are already held by the existing advisory committees, and there is little at the present to prevent further encroachment on university independence as budget pressures grow.

The public hearings and discussions following the publication of the draft report are now nearly concluded, and the Commission is getting to work on the revisions required for the final report. Whatever changes are made in the recommendations, and whatever government does with the recommendations, it seems fairly clear that the Seventies are going to be quite different from the Sixties.

Almost all that I have said about our work might be used to define issues or problems to address in your programs of institutional research. But let me try to note some of the principal questions on which we will continue to gnaw for at least a decade.

First, the pressures on money are not going to be less severe. We simply have to do something about measures of output. As we all know, in most social services, including education, we presently use input as a proxy for output. What does this really mean? In practice, in education, it means that longer and more expensive courses are by definition better in proportion to their length and cost. It is still nearly impossible to conceive of alternatives to present educational programs that are shorter and cheaper, and not less prestigious or less satisfactory. We have got to come to define criteria for assessing alternatives in terms of outcomes.

Given the importance of social and economic factors, we will need to know a lot more about our students, their backgrounds, and their experience subsequent to formal education. The kinds of analyses done by Hansen and Weisbrod in California, and our own work in Ontario on the economics of higher education are just scratchings of the surface. Lots more work will have to be done to fine tune our financing and loan systems: whether the Commission recommendations on separate funding of research are accepted or not, there will be more work devoted to the costs of research. And lots more information will be needed as feedback for an effective career guidance system. If, as I expect, the major source of future enrollment growth will be from working adults, rather than school-leavers, we will need to be in a position to define new program needs.

It is a fascinating prospect and not one that I see with any forboding. I have no doubt from what we have learned that our people cherish education sufficiently to provide the resources that will be necessary fully to develop our human potential.

COMMENTS ON THE DRAFT REPORT OF THE COMMISSION ON POST-SECONDARY EDUCATION IN ONTARIO

Bertrand L. Hansen
Council of Ontario Universities

The report of the Ontario Post-Secondary Commission is highly readable and certainly provocative. It has generated a good deal of comment in Ontario much of which is highly charged. In terms of the institutional research it might be expected to generate, I should say that, using the term loosely, it has already generated a great deal of research for the research and secretariat staff of the Council of Ontario Universities. We have been engaged in extensive research to develop a cogent, collective response. This response has had to go through five draft stages so you will understand the difficulty in getting agreement on one response which is intended to represent the collective views of the university community as represented by a council of fourteen university presidents and their fourteen academic colleagues.

I recall that one of the most serious criticisms of the Commission was that it spent $1.4 million to come up with the same recommendations as the Newman report which cost only $35,000. After observing the build-up of opportunity cost in responding effectively, I'm less inclined to be critical. Mind you, I still think it was too high a price to pay for what I have seen in the draft report, but our own build-up of cost in responding confirms that participatory planning is anything but cheap.

Many people in the university community have commented favorably on the aims and objectives of the report, particularly in its social aspects. Conversely, there has been an equal amount of criticism of the report for its neglect of quality and the traditional goals of a university education. The heaviest fire has perhaps been reserved for the proposed reorganization of the management structure (that is of the advisory bodies) and for the financial recommendations. This is quite natural because it is here that the universities have the most to lose in yielding up decision-making authority to centralized levels and power to depress rates of increases to revenues. The coordinating board recommendations which have caused the most concern among the members of the Council have stimulated a type of institutional research, that is, research on management organization, with the result that the Council has a feasible alternative to propose. I should note here that at the outset of our discussions in preparing a response we had agreed not just to snipe at the report but rather to recommend preferred alternatives.

The financial recommendations, if implemented, will have the most impact on institutional research, specifically recommendations 61 and 64 having to do with reapportioning fees and government grants, student support and student aid. Any proposals to shift the burden of support from government grants to student fees is going to generate much heat followed by research on costs, and much speculation and rhetoric on benefits. The model of Appendix E is no doubt a first-generation model (there has been much criticism that it is too simplistic) which implies an enormous amount of institutional research to refine definitions and to generate information to input to the model. Class sizes, teaching loads, percent faculty salaries, average salary levels, student contact hours, faculty contact hours all involve data collection. What is a teaching load? What is included in faculty salaries? How are average salary levels determined – especially conversions for part-time instructors? What is included in student contact hours? How are class sizes determined? Do they include tutorials and individual instruction? Is the arithmetic mean or the harmonic mean the appropriate measure of central tendency?

With respect to the division between teaching and research, what is included in teaching and what is included in research? Faculty activity studies will multiply. First-generation models are succeeded by second and third generations implying more complex models calling for more sophisticated information. Institutional researchers' hearts may beat more quickly with the prospect of all this additional research and responsibility, but I can assure you that university presidents and faculty shudder at the cost implications, the threats to university autonomy, and to the way of life of the academic.

The present financing formula contains within it support for teaching and research. There are very serious reservations about the proposals to change the formula by funding research separately from teaching, especially if the criteria for funding research are not established *prior to* the separation. Universities fear that government will see this as an opportunity to decrease support by not seeing any *worthy* research in the offing.

With respect to student aid, the Council doesn't believe the proposals of the Commission are consistent with its own aims and objectives of improving accessibility – it believes that they will have an opposite effect, in fact, and it prefers its own proposals on student aid submitted earlier.

In short then, the Council approves in general of the objectives of social accessibility, questions the lack of concern for educational quality, questions and criticizes the financial analysis and projections of costs, rejects the coordinating board and student aid proposals, but at the same time proposes alternatives, supports the present system of financing with modifications but agrees that research requires special study. The response is now a public document, by the way, and is being bound with selected submissions from subcommittees of the Council for wide distribution within the university community. I recommend both the Commission draft report and the Response of the Council as reading for different views of the goals, structures, and control mechanisms most appropriate for post-secondary education.

INSTITUTIONAL RESEARCH IMPLICATIONS OF ONTARIO'S WRIGHT COMMISSION ON POST-SECONDARY EDUCATION

Bernard S. Sheehan
The University of Calgary

The Commission on Post-Secondary Education in Ontario was established by the Government of Ontario in April 1968. Commission terms of reference were to advise "the pattern necessary to ensure effective development of post-secondary education in the province during the period to 1980 and in general terms to 1990." Chaired by Dr. Douglas T. Wright, the Commission issued a 112-page draft of its final report in January 1972.[1]

Seventy-two recommendations catalogued in the draft report were deduced from the following set of principles derived by the Commission from its perception of the goals of post-secondary education:

1. The need for universal *accessibility* to post-secondary education for all citizens regardless of age;
2. The need for *openness* of all educational services to the public and their integration with the general cultural activities of the community;
3. The need for *diversity* of educational services in terms of institutions, admission standards, programs and length of courses;
4. The need for *flexibility* in educational planning to ensure a post-secondary educational system which is always responsive to appropriate social demands;
5. The need for *transferability* of abilities, aptitudes and skills from one post-secondary educational enterprise to another;
6. The need to recognize the political reality of *public accountability*, which must not be confused with bureaucratic controls and meddling.

This report may have far-reaching influence not only on post-secondary education but more generally on the social life of Ontario, and indeed throughout Canada. The report has been strongly criticized and also heralded by others as an important statement.[2] Whatever the final judgment, it is a document which raises serious questions and demands careful thought.[3]

The purpose of this paper is to suggest the report's institutional research implications. Because of the sheer number of significant recommendations, it will be possible in this short space to do little more than order or classify the recommendations. Therefore, to provide a framework for the classification structure, the following six activity categories of institutional research are posited.

Number	Activity Category	Description
1	Academic Planning	At all levels from academic departments to university systems and expressed as programs and resources; organization of the academic year.
2	Financial	Academic program cost studies, problems related to resource allocation, fee-for-service in nonprofit institutions, implementation of planning programming budgeting systems.
3	Physical	Space and equipment inventories and utilization studies and systems.
4	Information Systems	Management information systems, simulation models and answers to "what if" questions, integrated data bases, inter-institutional information problems and systems.
5	Statistics	Answers to *ad hoc* requests for statistics from university management, agencies; projections of various parameters.
6	Special Studies	Students, manpower need projections, faculty related topics and learning technology.

In order to achieve this classification, each recommendation will be grouped under the institutional research activity to which it is related most prominently. The numbers in parentheses in the following paragraphs refer to the numbers of the recommendations as they appear in the draft report. Another dimension of this classification is attained by Table 1 (see below), which associates each recommendation with significant institutional research implications with the institutional research activities most likely to be influenced by the recommendation.

ACADEMIC PLANNING

Considerable detailed academic planning will be required before implementing the Commission recommendation that formal academic programs in universities and colleges be integrated with students' practical experience which may be substituted for conventional laboratory and practicum work (4). Also, much planning and development will precede the introduction of regular short courses for intensive upgrading or retraining of professionals or paraprofessionals (6). These courses would facilitate realization of the notion that all professions should include a spectrum of practitioners (35) who have a real opportunity to proceed through the full range of skills and responsibilities characterizing the profession (36).

The Commission suggests that new opportunities be opened for anyone who wants to study on a part-time basis (22). This includes graduate study, with related research done off-campus credited (8) toward the advanced degree. These opportunities are enhanced, and much academic planning implied, by the suggestions that communities away from universities develop university courses in affiliation with the universities (15) and establish satellite campuses (16) and small colleges of 200 students (19) where practical. Also, the colleges of applied arts and technology should grant distinctive degrees to students completing the three-year program (26). These degrees should be appropriately recognized by the university as advance credit towards university degrees (36).

Only after the most painstaking planning could the current curricula be abandoned in favor of a flexible approach more appropriate to the individual student. Student flows and resource requirements would be even more difficult to predict if patterns of courses were merely described but not held as mandatory and if evaluated skills were substituted for prerequisites (25). Applying the same principles to professional practice, the report would have admission judged on the basis of examination and experience with mandatory re-examination every ten years (31).

A major Commission recommendation (21) would create a University of Ontario to provide television, radio and correspondence programs for degree credit. Although the proposal combines features of two British institutions, the Open University and the Council for National Academic Awards, a good deal of academic planning will be required before the University of Ontario can be usefully launched.

The last recommendation (72), that grants by the government should be made and announced on a rolling three-year basis, will encourage planning. Annual allocations to universities on the basis of formulae have discouraged short-range planning. Thus, the implementation of this recommendation will also improve annual institutional operations.

FINANCIAL AND PHYSICAL

Although virtually all Commission recommendations have operating and capital dollar implications, only a few may be considered to have primary impact on this area of institutional research. Among these are the proposals that community libraries hold materials needed to support University of Ontario courses (17) and, reciprocally, that university libraries be open to the public (18). In the same category are the suggestions that institutions be free to set their own tuition fees (62) and that the universities and colleges move toward a unified formula system for operating and capital grants (71).

More fundamental will be the institutional research associated with recommendation 61. This proposal advocates that institutional operating grants be divided into two parts: (a) 50% of instructional expenditures; and (b) payment for research and other activities on a long-term basis. It would appear this deceptively simple and perhaps convenient and politically saleable advocacy will require considerable study, especially in view of the obvious questions it raises and the many other propositions in this field reported in the past decade.[4]

INFORMATION SYSTEMS AND STATISTICS

The Wright Report groups a set of recommendations in Chapter IV, *Instruments of Implementation*. Each of these applies a management function and thus must be supported with appropriate information. They have direct implication in both the information systems and statistics categories of institutional research.

Implementation of these proposals would mean that all provincial support for post-secondary education would be funded through a single government department (49). Post-secondary education is interpreted widely by the Commission and includes the colleges of applied arts and technology, trade schools, museums, art galleries, science centers, and libraries. Further, a Senior Advisory Committee (50) would be established to advise the minister on allocation of funds between various sectors of post-secondary education upon request from the three proposed coordinating boards. One coordinating board would relate to the universities, one to the colleges of applied arts and technology, and a third to the open sector (51). The Coordinating Board for Universities would have jurisdiction to establish and discontinue new faculties, programs and admission standards and to distribute operating and capital funds according to an objective formula (52). The University of Ontario would be under the jurisdiction of the Coordinating Board for the Open Sector (54).

The proposed recognition, for the sake of diversity, of at least three models of university and college governance (56) will greatly stimulate the demand for comparative management information and statistics. The establishment (47) of the Ontario Human Resources Commission to advise and administer government guidance programs and the widespread (48) availability of these programs will also require considerable informational support.

SPECIAL STUDIES

Many of the Commission's recommendations seem to infer special studies to gain information necessary for their successful implementation and to monitor the early years of their operation to detect features requiring modification. For example, conditional admission after two years away from full-time study (7), integrating student housing with general public housing (14), and forcing the current Grade 13 standard in 12 school years (29) are meritorious suggestions but presumably with unpredictable complications needing study.

The Wright Report is against discrimination on the basis of sex. It recommends that academic positions in a university should reflect a proportion of women receiving Ph.D.'s in that year (39). By 1976 the percentage of women with tenure should equal the 1971 percentage of women holding nontenured positions (40). By 1981 the proportion of female faculty at each level in Ontario universities must equal the proportion of females receiving doctoral degrees in Canada in 1971 (41). These are laudable recommendations, but they need study. Similarly, recommendation 60, which calls for proper procedures and policies affecting appointments, promotions and dismissals to be worked out in detail by the institutions and their employees, will need background and normative information.

The Canadian Human Resources Commission (46), which would advise both the governments of Canada and Ontario on matters pertaining to manpower projections and educational planning, has in its proposed terms of reference the charge to sponsor and establish studies on manpower planning and educational planning. Also, the proposed changes in existing schemes for student aid, bursaries, loans and grants (63, 64) and the monitoring of results of the new programs followed by the publication (65) of these results will involve considerable institutional research in this category.

Table 1 illustrates the broad spectrum of the institutional research task involved in a full appreciation and implementation of the Commission's recommendations as articulated in the draft report.

CONCLUSION

The Wright Report recommendations suggest fundamental changes to the system of post-secondary education in Ontario. To anticipate the full impact of these changes, to determine how best to implement the recommendations, to develop the new operating procedures and to devise methods to measure the ongoing influences of these changes implies considerable institutional research activity.

TABLE 1
Institutional Research Activity Categories Associated with Pertinent Commission Recommendations

Institutional Research Category	Draft Report Recommendation Number																																						
	4	6	7	8	14	15	16	17	18	19	21	22	25	26	29	31	35	36	37	39	40	41	46	47	48	49	50	51	52	54	56	60	61	62	63	64	65	71	72
Academic Planning	X	X		X		X	X			X	X	X	X	X	X	X	X	X	X				X										X						X
Financial						X	X	X	X	X		X		X		X	X	X	X														X	X	X	X	X	X	X
Physical						X	X	X	X	X		X		X			X	X	X														X	X				X	X
Information Systems	X						X																			X	X	X	X	X	X		X					X	X
Statistics										X	X												X	X	X	X	X	X	X	X	X								
Special Studies			X		X					X	X	X	X		X		X	X		X	X	X	X	X	X							X			X	X	X		

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1. *Draft Report*, Commission on Post-Secondary Education in Ontario (Toronto: Queen's Printer, 1972).

2. David Stager, "Wright Report – Is It Just Old Wine in New Bottles?" *The Globe and Mail* (Toronto, January 27, 1972; David Judge, "Wright on – or Way off Base?", *Canadian University and College*, January-February, 1972; "Editorial" and several articles from Financial Post (Toronto), March 25, 1972.

3. See, for example, *University of Toronto Bulletin*, February 25 and March 3, 1972.

4. Lee W. Hansen and Burton A. Weisbrod, *Benefits, Costs and Finance of Public Higher Education* (Chicago: Markham Publishing, 1969); and John Porter, Bernard Blishen *et al.*, *Towards 2000* (Toronto: McClelland and Stewart, 1971).

TOWARD ACADEMIC DEVELOPMENT AND CURRICULAR RENEWAL IN THE CONTEXT OF INSTITUTIONAL STABILITY

Thomas Maher
University of Kentucky

Donald A. Ostasiewski
Thomas More College

Abrupt deceleration of growth in American higher education has understandably focused administrative attention upon the issues of maintenance (and often survival) at the expense of experimentation and development. One of the potentially most difficult, but largely unexplored tasks before American universities is the invention of procedures to insure institutional renewal in the context of economic stability or even decline. To be sure, educational revitalization is a responsibility shared by all components of an institution. Yet, there are indications that sets of functions now present in only embryonic form might become major catalytic factors in the process of renewal. This emerging role seems to be a hybrid, integrating elements of institutional research and planning and academic administration for the purposes of academic development.

In the ecology of University governance, academic developers would be freed from routine tasks in order to design educational experimentation, assess programs, translate educational research into policy and invent academic alternatives. Although a number of individuals in a variety of settings are currently charged with these tasks, their leverage within their respective institutions remains tentative. Traditional faculty hostility toward intrusion into the educational function, the dominant maintenance functions of University organization and limited resource commitment for R and D are the factors currently constraining the evolution of academic development and institutional renewal.

"Renewal," especially must have an operational definition central to the evolution of academic development. "Renewal" is used here within a rather specific framework. It is seen as a systematic, ongoing process of restructuring; the capability of institutions to encourage, generate, implement, test and adopt new ideas, both in anticipation and response to a changing set of environmental conditions. Renewal is a particular form of social change, not a once in twenty year cataclysm or ad hoc adaptation as a response to crisis. Muscatine seems to have best captured the flavor of change appropriate for the University.

> For the permanent health of our academic community, we would prefer to see it change gradually and continuously rather than have it suffer the shocks of dramatic adjustment following periods of quiescence.[1]

Mature and stable societies have always had difficulty institutionalizing an adequate adaptive capacity. Risking simplistic generalization, cultures have been most vibrant during growth or crisis, at the time of collision with an alien culture or when sustained by an invigorating integrative ideal. Upon reaching the limits of growth, most have retained traditional approaches which often proved dysfunctional as the sustaining environment underwent change. Historically, few models of successful renewal in stable organizations are available, and their invention should be a top priority concern on the human agenda as a steady-state society begins to take shape.

The current shape of higher education must legitimately be viewed as a harbinger of a stable society. The bleak job picture and declining financial resources seem to be more than a temporary aberration. According to the AAUP, the real (constant dollar) value of the average faculty salary has slipped to slightly less than it was three years ago, and the trend toward greater reduction in the years ahead is unmistakable."[2] Most signs indicate that financial scarcity will be the major factor in the academic development equation for some decades to come.

Implementation of systematic renewal in higher education is complicated by the fact that the University has evolved a set of responses designed to enclose or protect rather than to generate a sense of high adventure. Its inner organization is well suited to the task of maintenance, appearing to be a loose network of well-constructed fortifications. Sir Eric Ashby's comment about university organization resembling a "federation of anarchies" rings true, for encapsulation of individuals and units within universities slices feedback loops and thus minimizes the capacity for integrated response.

Douglas Sloane has labeled this phenomenon "bureaucratic consensus,"[3] arguing that the American university has organized itself around certain structural arrangements and working procedures rather than philosophical concerns. Its existence has been dependent upon a balance of interests within and on the ability of the larger society to tolerate its functions. Arising late in the 19th century, this "bureaucratic consensus" has served as the matrix which provided the basis for extensive growth and dramatic accomplishment. In large measure, its success flows from an ability to accommodate a great plurality of individuals, ideals and functions within the institutional boundary of the university. Pursuits as diverse as dental hygiene, classics and light horse husbandry can and do exist in harmony on the same campus.

On the other hand, with attention directed to maintenance of an organizational consensus, concern about general purposes of the university became essentially tangential to the institutional forces shaping the development of higher education. Without sustained philosophical analysis of underlying ideals, the idea of the university faded quickly. In many respects, the undergraduate general curriculum is but a microcosm of the larger bureaucratic consensus which sustains the total university. In its dominant form it appears to have developed out of political compromise, and it is difficult, if not impossible to discover a set of goals against which to assess its output. Thus, as it is isolated here for hypothetical exploration of issues involved in renewal, it should be borne in mind that insights gleaned can be applied to many other sectors of the institution.

Although a range of variants has emerged within the past several years, the paradigm general curriculum has been substantially locked into some shade of the lower/upper division, generalization/specialization pattern for much of this century.

Advocates of change have made only slight inroads with the concepts of a three year degree, by-pass techniques such as the CLEP examination series, topical options and the open Bachelor of General Studies degree. A small number of experimental colleges have arisen, each testing a variant of the undergraduate curriculum. Most, however, are enmeshed in a web of factors such as high costs, select student bodies, and a counter-culture orientation which lessens their value as models for widespread adoption. No alternative approaches have yet provided real options as far as the mass of American undergraduates are concerned. At best, a bright, creative student seems now to have the option of fashioning at least part of his program at most institutions.

The "distribution" curriculum, i.e., one requiring distribution of student effort across a spectrum of the basic liberal arts disciplines, remains virtually intact because it is linked into a remarkable coalition of forces. *Politically*, it complements the "bureaucratic consensus" by legitimating the role of traditional disciplines or areas *(e.g.* social science) and locking them into a fairly stable equilibrium. *Organizationally*, it can be argued that the distribution system requires less energy (and thought) to maintain than would any alternative. Potentially complex tasks such as advising and scheduling are greatly simplified and routinized. *Economically*, cost of instruction is dramatically reduced through the use of teaching assistants and the large section/lecture format. *Functionally*, the distribution requirement system seems designed to support higher costs of upper division and graduate work. It represents the potential elasticity that allows a college or university to buy time in a financial crisis. *Educationally*, the distribution requirements can be justified in that they are said to "expose" the student to a variety of interests.

A final deterrent to change is the ease with which the idea of distribution requirements is communicated. Its simplicity undermines reformers whose arguments are complex and difficult to communicate in the settings which academic decision-making offers.

What reply might the academic developer make to these circumstances? Why should he wish to tamper with this key to what little financial slack the institution may retain? What conceivable change could be conjured to obviate the advantages, on a large scale, which the distribution system offers? In answer, it can be pointed out that this curriculum is appropriate to a *maintenance* oriented academic planner. Given the concern for institutional renewal, there are two general responses: one educational/philosophical and the other organizational.

At the heart of much of the diffuse though sustained criticism of the "distribution" curriculum is a pervasive concern that mass higher education does not educationally connect with the average undergraduate. If liberal education, rather than being only knowledge oriented, should be directed to help students to transcend provincialism, to develop inner resources and to create personal styles of learning, then there are probably many alternative educational routes along which students may develop toward these ends.

Despite its efficiencies, this dominant mode of general education appears to hinder university faculty and students from converting contemporary events and new ideas into learning capital. For example, few undergraduates come to grips systematically or intensively with problems, issues, or ideas as pervasive as Vietnam, freedom, the environment, or even higher education itself. Generally unnoticed in the typical undergraduate general curriculum are the emerging ideas of men such as psychologist B. F. Skinner, generalist Lewis Mumford, or theologian Martin Marty as well as developing disciplines such as general systems theory, ekistics and futuristics.

Another argument begins with the social process generated by the curriculum. From an organizational perspective, distribution requirements represent a relatively closed social system, into which only certain people and ideas are admitted. These are quickly channeled into regular patterns, and usually have little lasting impact upon the overall structure of the curriculum. In its present form, then, the "distribution" curriculum is partially paralyzed in its ability to utilize new people, issues, and disciplines as renewal potential. This is because it is organized and planned in regard to the inclusion or exclusion of certain categories of knowledge requirements rather than in terms of the developmental experience of the student.

In a time of emerging stability, the "distribution" curriculum as now constituted seems more prone than other university programs to close in upon itself. It is one of the functions most likely to be conserved as an elemental money saver. If we are interested in the vitality of educational programs, then, the general curriculum is a focus which requires particular attention from the renewal-minded academic developer.

Basic economic issues often are the primary barriers to serious consideration of alternatives. Without analysis of rationale here, it is at least now possible to suggest that the work of Bowen and Douglass[4] and others has demonstrated the financial feasibility of substituting a variety of educational experiences for the traditional lecture/distribution format. While these plans assume restructuring throughout the university, they nevertheless provide a hypothetical point from which to initiate discussion of new possibilities. The curricular renewal problem, then, revolves primarily about the means of opening the distribution curriculum to a broader range of subject matter and experience. Next, a curricular pattern must be developed that will encourage both students and faculty to create tentative and experimental relationships from both new and existing learning resources.

Given the conditions of stability which seem to be emerging, the academic developer no longer can rely upon flows of people and excess resources to generate and sustain this restructuring. He is left with the possibility of creating new forms of information and linking them realistically into the decision-making process. As he approaches the general curriculum, the potential academic developer has a basic strategy and three "realms" within which he may assist the institution in generating these alternative patterns of information. The strategy focuses upon the notion of temporary systems developed and popularized by Bennis[5], Havelock[6], and Miles[7], among others. In educational settings, the use of temporary systems as a strategy for renewal means the sustained use of temporary ad hoc problem oriented groups to generate new forms of and channels for information and to perform linking functions. The realms within which this strategy may be employed are the *educative function* (vis-a-vis the faculty), the *analysis and assessment function*, and, finally, a role in hypothetical *renewal curriculum.*

The educative function might proceed on two fronts. The first might be an attempt to create settings for conversation on general educational matters away from the pressure for immediate decisions. This approach would allow institutional roles to unfreeze and thus generate the possibility of real intellectual discussion of curricular issues apart from pragmatic policy consideration.

A second approach might involve working with the structure of *standing* committees, to release their grip upon maintenance functions and orient them toward development. In the final analysis, the point is to raise the level of educational understanding among faculty, for this is the real base from which academic development proceeds.

A developmental assessment process must emphasize both quantitative analysis and appraisal against: (1) unit or program purposes and university goals, (2) current needs and projected needs of society and societal conditions, (3) strategies utilized in other institutions, (4) alternative futures, in terms of both goals and processes.

An appropriate selection process should bring to assessment (at any one time) a mix of problems, units and programs from varying levels of the university organization. In the context of the general curriculum, the university could conduct simultaneous assessment of the "freshman year," the English department, the social sciences and the B.A. in History.

The two concerns that form the backbone of a renewal oriented evaluation process are the insistence on productive or divergent rather than convergent thinking and a sharing of resulting recommendations in an open forum. Provision must be made for the decision-making process to act visibly and within a reasonable time frame to consider the recommendations.

Well-conceived assessment is a potential key to academic development in that it can bring together ad hoc linking groups, focus attention upon purpose, generate new ideas as a resource for program building and encourage interest in recent educational research as an aid to policy-making.

Both of these efforts, the evaluative and the educative are instruments toward clarification and rational critique of the distribution requirements. Failing to produce curricular change in a given time period, both functions would no doubt wither and along with them the potential of academic development. They will evolve only when they operate as functional elements of a renewal curriculum.

One model of a renewal curriculum is to be found in what could be called the "cluster" concept. The idea itself is simple, akin to many of the experimental efforts now in process and appears to lend itself well to the demands of mass education. With the aid of advisement and within the framework of proficiency requirements,[8] the student would gather resources of the university and its environment into a series of personalized clusters.

An organizational format could be contrived from four distinct educational foci: (1) the traditional disciplines, (2) direct experience, (3) problems, issues, ideas (4) what might be called a "legal hunting ground"[9] or settings in which meaning could be playfully pursued and tested in a number of combinations. The crucial task of the academic developer would be to discover and to suggest organizational niches for each of the foci and to evolve a set of procedures to encourage each undergraduate to relate them in a creative manner. One might guess that as each student and his advisers designed personalized paths toward general objectives, they would generate new "trails" among the four foci. Consequently, new sets of relationships among the foci would be in continual evolution, almost in Kaleidoscopic fashion.

Traditional departments could remain as an organizational backbone, but would owe each of the remaining three foci a designated number of joint appointments. These individuals would serve on revolving committees charged to develop short-lived experiential settings, to create problem issue work or to generate the legal hunting ground. To consolidate the organizational locus of each foci, departmental chairmen in disciplines now involved in the distribution requirements would find themselves assigned to a committee responsible for governing one of the three additional foci areas. A chairman would then add stewardship of a foci area to his primary departmental duties. Reward and recruitment policies would have to be adjusted accordingly.

Another focus for renewal in this curricular scheme would be small faculty teams constituted to assess student progress in constructing "clusters". A further example of temporary systems in operation, this procedure would not only bring together men to engage issues overlapping their areas of expertise, but would also afford the possibility of external input through outside examiners. While high costs prohibit the use of large scale outside examination in mass education, a small number of these individuals could make a sizable impact if assigned randomly to assess both student progress and the quality of the exam session itself.

Economic feasibility of this curricular departure would rest upon new concepts of teaching, advising, and testing loads which the "developer" could devise. Growth and consolidation would hinge upon the case made for examination of new instructional strategies and new modes of redistribution within the curriculum. Curricular health would be a function of ongoing planning analysis, assessment of priorities, generation of alternatives and consequent recommendations for reallocation.

All of this, of course, is conjectural. In the real world, the circumstances of decelerating growth and the network of constraints which characterize contemporary university organization combine to cloud the future of an emerging renewal centered administrative role. Yet, until institutional research and academic administration shift some attention to academic developmental issues, we will not know whether true university renewal can be a reality or whether it is simply another emphemeral will-o-the-wisp. For the sake of the creative development of mass higher education, however, let us resolve to think seriously about the issue.

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1. *Education at Berkeley: Report of the Select Committee on Education*, University of California Press, Berkeley, 1966, p. 4.
2. *Higher Education and National Affairs*, American Council on Education, Vol. 21, No. 18, May 5, 1972, p. 3.
3. Douglas Sloane, "Harmony, Chaos and Consensus: The American College Curriculum," Teachers College Record, vol. 73, no. 2, December 1971.
4. Howard R. Bowen and Gordon K. Douglass, *Efficiency in Liberal Education* (New York: McGraw-Hill, 1971).
5. Warren G. Bennis, *Changing Organizations: Essays on the Development of Evolution of Human Organization* (New York: McGraw-Hill, 1966).
6. Ronald G. Havelock, *Planning for Innovation through Dissemination and Utilization of Knowledge* (Ann Arbor: Institute for Social Research, University of Michigan, 1971).
7. Matthew B. Miles, "Innovation in Education: Some Generalizations," in *Innovation in Education*, edited by Matthew B. Miles (New York: Teachers College Press, 1964).
8. Paul Dressel, in *College and University Curriculum*, Second Edition (Berkeley: McCutchan, 1971), speaks of a set of proficiency requirements or essential elements of general education apart from specific course requirements. He sees them comprising a "flexibly, rigid" curriculum and includes such items as: the student having sustained contact with at least two disciplines or areas of study; the student confronting several current problems directly affected by the disciplines he is studying; the student confronting a distinctively different culture and value system; and the student having team experiences in learning and problem solving.
9. We appreciate the advice and criticism of our colleague William Lombus on these ideas.